CALIBRATION AND SERVICING HANDBOOK

for

THE DATRON AUTOCAL 1082 and 1081 DIGITAL MULTIMETERS

(The calibration and servicing information in this Handbook applies equally to the
Autocal instruments 1081 and 1082.
For operating procedures refer to the User's Handbook.)

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For any assistance contact your nearest Datron Sales and Service center.
Addresses can be found at the back of this handbook.

Due to our policy of continuously updating our products, this handbook may contain minor differences in specification, components and circuit design to the instrument actually supplied. Amendment sheets precisely matched to your instrument serial number are available on request.

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SECTION 1

CALIBRATION

1.1 INTRODUCTION

1.1.1 General

The purpose of calibration is to take account of any long-term drifts in the components of the instrument and to restore the accuracy, traceable to a known standard.

The period between calibrations depends upon the accuracy performance required from the instrument and for guidance, guaranteed accuracies for 24 hours, 90 days and 1 year are quoted.

The calibration procedures presented in the following pages should cater for most calibration situations. If, however, a special problem arises, please contact your Datron Service Center.

1.1.2 The Essentials for Good Calibration

Temperature - So that the instrument can meet its specification over the quoted temperature range, the temperature environment should be stabilized at 23°C ± 1°C. In addition, temperature gradients around the instrument should be considered, therefore calibrate the instrument in its normal operating position and allow plenty of room for ventilation.

Warm up - It is essential that the instrument has fully temperature stabilized if the best results from calibration are to be achieved. Therefore, at least a 2 hour warm-up period is recommended during which time the line supply or the covers should not be removed even for a short period. In addition, if the covers have been removed, make certain that they are correctly fitted and that the leaf contacts to the Ground and Guard Shields are in good shape.

Calibration Source - To perform a useful calibration the accuracy of the source should always be at least four times that of the instrument being calibrated. In most cases, examples of likely sources are given for each calibration function.

With some calibration sources, the output may take several seconds to settle to a final value, therefore unless a shorter settling time is assured, a period of 10 seconds is recommended before each calibration operation.

Guarding - It is preferable to arrange for the DMM to be calibrated with 'Local Guard' selected. Furthermore to arrange for the 'Lo' terminal of the DMM to remain at ground throughout and let the the calibration source float. If a 'Remote Guard' connection is necessary then examples are shown in the User's Handbook.

1.1.3 The 'AUTOCAL' Process

1.1.3.1 General

The Datron 'AUTOCAL' process means that complete calibration of AC, DC and Ohms on every range can be carried out from the instrument's own front panel. In the process, an internal non-volatile memory stores calibration constants for each function and range as determined when the instrument takes a series of 16 readings of the applied calibration source. Internally, each of the readings is deviated by one sixteenth of a digit and when an average is taken, the instrument is able to resolve to better than one least significant digit displayed.

Access to the non-volatile memory is gained using a key inserted into the rear panel. When calibration is complete, the key is removed, therefore preventing accidental or unauthorized use of the calibration routine.

1.1.3.2 Procedure Outline

- Select the 'FUNCTION' and 'RANGE' to be calibrated and cancel any 'MODE' or 'COMPUTE' keys.

- Insert the key into the 'CALIBRATE ENABLE' keyswitch on the rear panel and turn to the 'CAL' position. (The 'cal' legend will be displayed on the front panel.)

- Set the rear panel IEEE Bus address switch to 31 i.e. all 1's.

- Connect the calibration source to the input terminals and operate the keys shown in the tables in the following pages. When a 'CALIBRATE' key is operated, its associated L.E.D. indicator will light and extinguish when the calibration operation is executed.

- When all calibration is complete turn the keyswitch to 'RUN' and remove the key.

1.1.3.3 The Five 'AUTOCAL' keys

'Zero' - This takes account of offsets in the instrument and in the calibration source.

'Gain' - This sets a scaling factor for each range and function.

'STD' - This very important calibration operation trims the internal master reference voltage. It must be preceded by a 'Zero' operation and is essential prior to a voltage calibration. See section 1.5.

AcHf - This flattens the response of the AC amplifier used for AC voltage measurement. It should only be used when a full calibration i.e. 'Zero', 'Gain' and 'AcHf' is carried out. The calibration action is iterative and requires several operations of the key to complete.

'Lin' - This is an important calibration operation as it optimizes the basic linearity of the internal measurement circuitry used for all ranges and functions. It must be used before any DC voltage of Ohms calibration is carried out.

1.1.3.4 'AUTOCAL' using 'KEYBOARD'

This is an extension of the 'AUTOCAL' process which is useful when using a calibration source set to a nominal value but with known errors. This means for example that calibration directly to a standard cell is possible. A full explanation of the procedure is covered in section 1.6.

1.1.3.5 'AUTOCAL' over the Bus

Each of the five calibration operations can be controlled using Option 50, the IEEE bus. This means that the instrument can be entirely calibrated remotely or under program control. As mentioned in the 'Procedure Outline' for a manual calibration, the rear panel address switch should be set to 31, i.e. all 1's. When a bus calibration is required the address switch must be set to the address number assigned to the DMM in the system. More details of calibration with the bus are included in section 1.7.

1.1.3.6 'Error 4'

If during calibration 'Error 4' is displayed, this indicates that the Calibration Source deviates too far from the calibration span of the instrument. Under these circumstances, the calibration memory is not updated and the calibration LED remains on.

In the case of 'Zero', 'Gain' or 'AcHf' the Calibration Source should be checked and the same 'CALIBRATE' key depressed. The 'Hold' mode may be released any time and the instrument will free-run again. If 'Error 4' follows 'STD' or 'Lin' or persistently appears following 'Zero', 'Gain' or 'AcHf' then an instrument failure may have occurred. Therefore either consult our Customer Service Section or the Servicing Section of this Handbook.

1.1.3.7 'Memory' Key

An 8-character memory is available to record a message, such as the last date of calibration or PRT probe serial number.

The stored message can be changed using the keyboard in 'Cal' mode. Proceed as follows:

a. On rear panel, insert key into CALIBRATION ENABLE switch and turn to 'CAL'.
b. Select 'KEYBOARD', press 'Memory' key, and use keyboard keys to enter the new message on the display (up to eight numerals).
c. Press 'Memory' key.
d. On rear panel, turn CALIBRATION ENABLE switch to 'RUN' and withdraw key.

The stored message can be displayed when not in 'Cal' mode, by pressing 'KEYBOARD' followed by 'Memory'.

1.2 DC VOLTAGE CALIBRATION

1.2.1 General

The procedure in the table opposite is all that is necessary to completely 'AUTOCAL' the DC voltage function. Steps 1 and 2 affect the accuracy on all ranges and should therefore be carried out even if just one range is being calibrated.

On each range a 'Zero' and 'Gain' calibration is required for each polarity of input. The two 'Zero' calibrations are included to overcome a possible zero difference with the polarity setting of the DC calibration source.

If the 'DMM Reading After Calibration' is not in accordance with the table, repeat operation of the same 'CALIBRATE' key is permissible to improve the reading.

1.2.2 Equipment Required

- A DC Calibration Source. e.g.:-
  Datron 4000 or 4000A

1.2.3 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL', use 'Spec' mode in conjuction with the 'CALIBRATION INTERVAL' switch on the rear panel, to display the specification tolerance. Refer to 1081 User's Handbook, Section 7.

DC VOLTAGE CALIBRATION

Step	Calibration Operation	Calibration Source Output	DMM Setting	'CALIBRATE' Key	DMM Reading After Calibration	Remarks
1	Linearity	Short Circuit	DC,1000 Filter	'Lin'	<10 digits	This calibration step may take around 30 seconds to complete
2	10V Range Zero	0.00000V	DC,10	ZERO	±0.000,00V ±1 digit	
3	10V Range STD CAL	+10.00000V	DC,10	STD	10.000,00V ±1 digit	Must be done for full calibration
4	10V Positive Full Range	+10.00000V	DC,10	'Gain'	+10.000,00V ±1 digit	If STD carried out on 10V range omit this step
5	10V Range Zero	−0.00000V	DC,10	'Zero'	±0.000,00V ±1 digit	
6	10V Negative Full Range	−10.00000V	DC,10	'Gain'	−10.000,00V ±1 digit	
7	1V Range Zero	+0.000000V	DC,1	'Zero	±000,000V ±1 digit	
8	1V Positive Full Range	+1.000000V	DC,1	'Gain'	+1.000,000V ±1 digit	
9	1V Range Zero	−0.000000V	DC,1	'Zero'	±.000,000V ±1 digit	
10	1V Negative Full Range	−1.000000V	DC,1	'Gain'	−1.000,000V ±1 digit	
11	.1V Range Zero	+0.0000mV	DC,.1 Filter	'Zero'	±0.000,0mV ±3 digits	Wait for the reading to stabilize before operating 'Zero'
12	.1V Positive Full Range	+100.0000mV	DC,.1 Filter	'Gain'	+100.000,0mV ±3 digits	
13	.1V Range Zero	−0.0000mV	DC,.1	'Zero'	±0.000,0mV ±3 digits	Wait for the reading to stabilize before operating 'Zero'
14	.1V Negative Full Range	−100.0000mV	DC,.1	'Gain'	−100.000,0mV ±3 digits	
15	100V Range Zero	+0.0000V	DC,100	'Zero'	±0.000,0V ±1 digit	
16	100V Positive Full Range	+100.0000V	DC,100	'Gain'	+100.000,0V ±1 digit	
17	100V Range Zero	−0.0000V	DC,100	'Zero'	±0.000,0V ±1 digit	
18	100V Negative Full Range	−100.0000V	DC,100	'Gain'	−100.000,0V ±1 digit	
19	1000V Range Zero	+0.000V	DC,1000	'Zero'	±0.000V ±1 digit	
20	1000V Positive Full Range	+1000.000V	DC,1000	'Gain'	+1,000.000V ±1 digit	⚡ Lethal voltages present - increase calibration source in 100V steps if possible
21	1000V Range Zero	−0.000V	DC,1000	'Zero'	±0.000V ±1 digit	
22	1000V Negative Full Range	−1000.000V	DC,1000	'Gain'	−1,000.000V ±1 digit	⚡ Lethal voltages present - increase calibration source in 100V steps if possible

1.3 OHMS AND PRT CALIBRATION

1.3.1 General

The Ohms Calibration Table opposite contains the complete sequence of operations necessary to 'AUTOCAL' the seven Ohms ranges and the kOhms-PRT function. If just the 'Ω' range or 'kΩ-PRT' is to be calibrated, steps 1 and 2 or the DC Voltage Calibration Table should be carried out first. Then on each range just a 'zero' and 'gain' calibration is required.

If the 'DMM Reading After Calibration' is not in accordance with the table, repeat-operations of the same 'CALIBRATE' key are permissible to improve the readings.

1.3.2 'Zero' Resistance Source

For accurate 'Zero' calibration on Ohms or kOhms-PRT it is essential that a correctly connected zero source is used. The necessary arrangement is shown in Fig. 1.1; it can be seen that a copper shorting link is required on 1MΩ and 10MΩ ranges, and that '4 wire Ω' selection is recommended on all ranges.

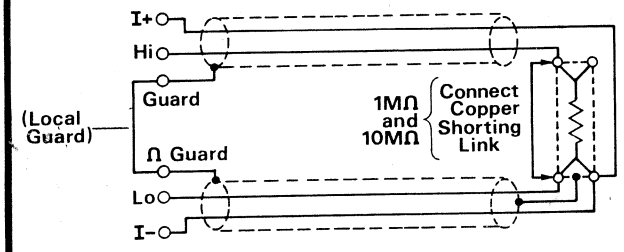


Fig. 1.1 ZERO RESISTANCE SOURCE CONNECTIONS

1.3.3 Equipment Required

Datron 4000, 4000A or a set of resistance standards in decades from 10Ω to 10MΩ.

It is essential that 10Ω to 100kΩ standards are 4-terminal devices.

1.3.4 Calibration of the kΩ-PRT Function

Calibrate the kΩ-PRT function under the same conditions as the normal 100Ω range and immediately following in sequence to avoid disconnecting the standard 100Ω resistor. On selection of 'kΩ-PRT', the .1kΩ range is forced, but '4 wire' must be switched manually.

1.3.5 Calibration to a PRT-100 probe

PRTs are originally calibrated by the manufacturer at the fixed temperature points of 0.000 and 100.00 deg.C. The resistance values at these points are given on the calibration certificate provided by the manufacturer.

To calibrate the 1081 to a probe, it is only necessary to enter these two values (or the latest recalibrated values) in the 1081 calibration memory. The procedure is as follows:

1. Switch on the 1081.
2. Ensure that the 1081 'kOhms-PRT' function is correctly calibrated. (Refer to Sect. 1.3.4).
3. a. Select 'PRT'.
   b. On rear panel, insert key into the CALIBRATION ENABLE switch and turn to 'CAL'.
   c. Select 'KEYBOARD', and use keyboard keys to enter the PRT resistance value at 0.000 deg. C.
   d. Press COMPUTE 'Zero' key (Cal. zero): 1081 responds by momentarily displaying '0°C' and cancelling 'Keyboard' mode.
   e. Reselect 'KEYBOARD', and use keyboard keys to enter the PRT resistance value at 100.00 deg.C.
   f. Press COMPUTE 'Gain' key (Cal. gain): 1081 responds by momentarily displaying '100°C' and cancelling 'Keyboard' mode.
   g. On rear panel, turn CALIBRATION ENABLE switch to 'RUN' and withdraw key.

The 1081 is now calibrated to the PRT, but not optimized for other PRTs.

It may be convenient to record the Serial Number of the PRT probe as a CAL message in the 1081 memory. The procedure is given in para. 1.1.3.7.

1.3.6 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL', use 'Spec' mode in conjunction with the 'CALIBRATION INTERVAL' switch on the rear panel, to display the specification tolerance.

OHMS CALIBRATION TABLE

Step	Calibration Operation	Calibration Source	DMM Setting	'CALIBRATE' Key	DMM Reading After Calibration	Remarks
1	10Ω Range Zero	4 wire zero	kΩ, 4 wire, 10Ω filter	'Zero'	±0.000,00Ω ±5 digits	Wait for the reading to stabilize before operating 'Zero'
2	10Ω Full Range	10Ω [1] Standard Resistor	kΩ, 4 wire, 10Ω filter	'Gain'	10.000,00Ω ±5 digits	Wait for the reading to stabilize before operating 'Gain'
3	.1kΩ Range Zero	4 wire zero	kΩ, 4 wire, .1	'Zero'	±0.000,0Ω ±1 digit	
4	.1kΩ Full Range	100Ω [1] Standard Resistor	kΩ, 4 wire, .1	'Gain'	100.000,0Ω ±1 digit	
5	PRT-100Ω Range Zero	4 wire zero	kΩ-PRT, 4 wire filter	'Zero'	±0.000,0Ω ±1 digit	
6	PRT-100Ω Full Range	100Ω [1] Standard Resistor	kΩ-PRT, 4 wire filter	'Gain'	100.000,0Ω ±1 digit	
7	1kΩ Range Zero	4 wire zero	kΩ, 4 wire, 1	'Zero'	±.000,000kΩ ±1 digit	
8	1kΩ Full Range	1kΩ [1] Standard Resistor	kΩ, 4 wire, 1	'Gain'	1.000,000kΩ ±1 digit	
9	10kΩ Range Zero	4 wire zero	kΩ, 4 wire, 10	'Zero'	±0.000,00kΩ ±1 digit	
10	10kΩ Full Range	10kΩ [1] Standard Resistor	kΩ, 4 wire, 10,	'Gain'	10.000,00kΩ ±1 digit	
11	100kΩ Range Zero	4 wire zero	kΩ, 4 wire, 100	'Zero'	±0.000,0kΩ ±1 digit	
12	100kΩ Full Range	100kΩ [1] Standard Resistor	kΩ, 4 wire, 100	'Gain'	100.000,0kΩ ±1 digit	
13	1000kΩ Range Zero	4 wire zero	kΩ, 4 wire, 1000, Filter	'Zero'	±0.000kΩ ±1 digit	
14	1000kΩ Full Range	1000kΩ [1] Standard Resistor	kΩ, 4 wire, 1000, Filter	'Gain'	1,000.000kΩ ±5 digits	
15	10MΩ Range Zero	4 wire zero	kΩ, 4 wire, 10MΩ, Filter	'Zero'	±0.000,00MΩ ±1 digit	
16	10MΩ Full Range	10MΩ [1] Standard Resistor	kΩ, 4 wire, 10MΩ, Filter	'Gain'	10.000,00MΩ ±25 digits	

[1] With Standard Resistor sources it may be useful to use the 'KEYBOARD' method of calibration - see section 1.6

1.4 AC VOLTAGE CALIBRATION

1.4.1 General

The procedure in the table opposite is all that is necessary to completely 'AUTOCAL' the AC voltage function. On each range just a 'Zero', 'Gain' and 'AcHf' calibration is required.

If the 'DMM Reading After Calibration' is not in accordance with the table, repeat operation of the same 'CALIBRATE' key is permissible to improve the readings. This will be necessary with the AcHf key.

Note: To reduce the effects of noise at low input levels, AC zero calibration is carried out at 0.1% Range; and for 100mV Range zero (steps 1 & 2 of the table), Guard is connected to Lo using a copper shorting link.

1.4.2 Equipment Required

A copper shorting link and an AC calibration source e.g. Fluke 5200A and 5215A.

1.4.3 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the 'Specification Verification' section of the User's Handbook can be employed. It describes the use of 'Spec' mode to verify the accuracy of the instrument, also providing a report sheet 'master copy' for compilation of permanent records.

AC VOLTAGE CALIBRATION TABLE

Step	Calibration Operation	Calibration Source Output	DMM Setting	'CALIBRATE' Key	DMM Reading After Calibration	Remarks
1	DC coupled AC Zero	0.100mV 500Hz (short Guard to Lo)	AC,DC,.1	'Zero'	0.100mV ±10 digits	Set 'Local Guard'. Do not set any filter Wait for reading to stabilize before operating 'Zero'
2	.1V Range Zero	Short Hi to Lo to Guard	AC,.1	Check only	<100 digits	
3	1V Range Zero	0.00100V 500Hz	AC,1	'Zero'	0.00100V ±1 digit	
4	10V Range Zero	0.0100V 500Hz	AC,10	'Zero'	0.010,0V ±1 digit	
5	100V Range Zero	0.100V 500Hz	AC,100	'Zero'	0.100V ±1 digit	
6	1000V Range Zero	1.00V 500Hz	AC,1000	'Zero'	1.00V +1 digit	
7	10V Full Range LF	10V rms 500Hz	AC,10	'Gain'	10.000,0V ±1 digit	
8	10V Full Range HF	10V rms 30kHz	AC,10	'AcHf'	10.000,0V ±10 digits	
9	1V Full Range LF	1V rms 500Hz	AC,1	'Gain'	1.000,00V ±1 digit	
10	1V Full Range HF	1V rms 30kHz	AC,1	'AcHf'	1.000,00V ±10 digits	
11	.1V Full Range LF	.1V rms 500Hz	AC,.1	'Gain'	100.000mV ±2 digits	
12	.1V Full Range HF	.1V rms 30kHz	AC,.1	'AcHf'	100.000mV ±10 digits	
13	100V Full Range LF	100V rms 500Hz	AC,100	'Gain'	100.000V ±1 digit	
14	100V Full Range HF	100V rms 30kHz	AC,100	'AcHf'	100.000V ±10 digits	
15	1000V LF Range Gain	500V rms 500Hz	AC,1000	'KEYBOARD 500V' 'Gain'	500.00V ±1 digit	⚡ Lethal voltage present - increase calibration source in 100V steps if possible
16	1000V HF Range Gain	500V rms 20kHz	AC,1000	'KEYBOARD 500V' 'AcHf'	500.00V ±15 digits	⚡ Lethal voltage present - increase calibration source in 100V steps if possible. DO NOT EXCEED 25kHz

1.5 STANDARDIZE USING 'KEYBOARD'

The STD key allows the user to trim or standardize the value of the internal Master Reference voltage. The facility can be used to correct for any long term drift, or to avoid a full recalibration of the 1081 when standardizing to local laboratory references.

STD calibration effectively changes the gain of all the voltage ranges in the same ratio, by a simple procedure available either on the 1V or 10V DC ranges. The process functions with a source of magnitude between 20% and 200% of the range selected but it should be noted that for equal magnitude source errors, standardizing at the lower percentage end of the range produces a higher percentage calibration error. An example using 'Keyboard' to standardize directly to a standard cell is shown in the table below.

STANDARDIZE EXAMPLE USING 'KEYBOARD'

Step	Calibration Operation	Calibration Source Setting	DMM Setting	'CALIBRATE' Key	DMM Reading After Calibration	Remarks
1	1V Range Zero	Short-circuit	DC,1	'Zero'	±.000,000V	Short connecting leads at Standard Cell end
2	Connect Standard Cell	Standard Cell	KEYBOARD	—	0	
3	Enter Standard Cell Voltage	Standard Cell	1,•,0,1,8,1,6,9,1	—	+1.018,169,1	
4	Standardize Calibration	Standard Cell	—	'STD'	+1.018,169	

1.6 AUTOCAL USING 'KEYBOARD'

1.6.1 General

The 'KEYBOARD' method of calibration is useful when a calibration source, although set to a nominal value, has known errors. In this situation the known value of the calibration source can be entered into the DVM before the 'AUTOCAL' process is executed.

'KEYBOARD' operates for sources of magnitude between 20% and 200% of the range selected but it should be noted that for equal-magnitude source errors, calibrating at the lower-percentage end of range produces a higher-percentage calibration error.

The process is available for the 'STD', 'Gain', and 'AcHf' calibration operations. An example using 'STD' is given in Sect. 1.5.

1.6.2 'KEYBOARD' with Negative Inputs

If the 'KEYBOARD' method is used on DC Voltage calibration with Negative polarity sources, it is important NOT to enter a negative sign with the keyed-in source value. The instrument itself can determine the polarity of the source and update the appropriate calibration memory location.

1.6.3 'KEYBOARD' Calibration Example

The example shown in the table below uses 'KEYBOARD' to calibrate the 1000V AC LF Range Gain at 500V (step 15 of the AC Voltage Calibration table).

CALIBRATION EXAMPLE USING 'KEYBOARD'

Step	Calibration Operation	Calibration Source	DMM Setting	'CALIBRATE' Key	DMM Reading After Calibration	Remarks
1	1000V Range Zero	1.00V rms 500Hz	AC,1000	'Zero'	1.00V ±1 digit	
2	Set and Enter Source Value	500.00V rms 500Hz	'KEYBOARD' then 5,0,0,•,0,0	—	0 then +500.00	Lethal voltage present. Increase Calibration Source in 100V steps if possible
3	1000VAC LF Range Gain Calibration	As above	—	'Gain'	500.00V ±1 digit	

1.7 'AUTOCAL' OVER THE BUS

All the calibration procedures covered in this manual can be carried out remotely using the IEEE Bus.

Effectively, the five calibration keys are replaced by five Bus instructions and these are used instead of the 'CALIBRATE' keys listed in the Calibration tables on previous pages.

An example of calibration with the Bus is given in the table below. A complete program listing for the same calibration operation assuming an HP9825 controller is as follows:-

```
0:  dim D$[15]                define 15 character string
                              variable
1:  clr 728                   send 'device clear' to DMM
                              (interface 7, address 28)
2:  wrt 728,"F3R3Q1W1="       program to DC 1V, SRQ
                              Mode 1, Enable Cal.
3:  0t→S
4:  wrt 728,"G0="             program zero cal. trigger
5:  oni 7,"srq"               jump to SRQ service routine
                              on interrupt
6:  eir 7,128                 enable SRQ interrupts from
                              interface 7
7:  if bit ("01XXXXXX",S)     check status byte S
    =0:jmp-1                  obtained by service routine.
8:  dsp "Apply 1V &           prompt operator to apply
    CONTINUE"                 calibration source on com-
                              pleting zero cal
9:  0→S;stp
10: wrt 728,"G1="             program gain cal. trigger
11: oni 7,"srq"
12: eir 7,128
13: if bit ("01XXXXXX",S)
    =0;jmp-1
14. wrt 728,"T0W0="           program to Internal Trigger,
                              Disable Cal. on completion
                              of gain cal.
15: lcl 728                   program DMM to local state
16: stp
17: "srq";rds(728)→S          SRQ service routine to read
                              status byte
18: red 728,D$
19: iret
*7717
```

CALIBRATION EXAMPLE USING THE BUS

Step	Calibration Operation	Calibration Source	DMM Setting	Bus Controller Instruction	DMM Reading After Calibration	Remarks
1	Set DMM to known state	—	In Remote State	'Device Clear'	—	Program DMM to predetermined state A0C0DXE0F3M0N0 O0P0Q0R6S0T5
2	Set DMM to DCV, 1V Range, and prepare for calibration	+0.000000V	Calibration key to 'CAL'	'F3R3Q1W1='	—	Program DMM to Function: DC V (F3) Range: 1V (R3) SRQ Mode 1 (Q1) Enable Cal. (W1)
3	1V Range Zero	+0.000000V	In Remote State	'G0='	±.000,000V	Program 'Zero' cal., SRQ indicates when calibration operation completed
4	1V Positive Full Range	+1.000000V	In Remote State	'G1='	+1.000,000V	Program 'Gain' cal., SRQ indicates when calibration operation completed
5	Set DMM to Internal Trigger, Disable Cal.	—	In Remote State	'T0W0='	—	Program DMM to Internal Trigger (T0), Disable Cal. (W0)
6	—	—	In Local State, Calibration key to 'RUN'	'Local'	—	DMM in normal mode, free-running

SECTION 2

MECHANICAL DESCRIPTION

2.1 GENERAL

The 1081 has been designed to be either rack mounted in a standard 19" rack (3½" [2U] height required) or bench top/portable with integral tilt stand. An exploded view of the instrument is shown in Fig 2.1.

2.2 FRONT PANEL

The front panel incorporates the signal input terminals, range, function, mode, keyboard, compute and power switches and a numeric/legend gas discharge display.

2.3 REAR PANEL

The rear panel incorporates the line supply, power input socket and fuses, analog output socket, rear and ratio signal input sockets, run/calibrate keyswitch and calibration interval (spec) select switch.

2.4 EXTERNAL CONSTRUCTION

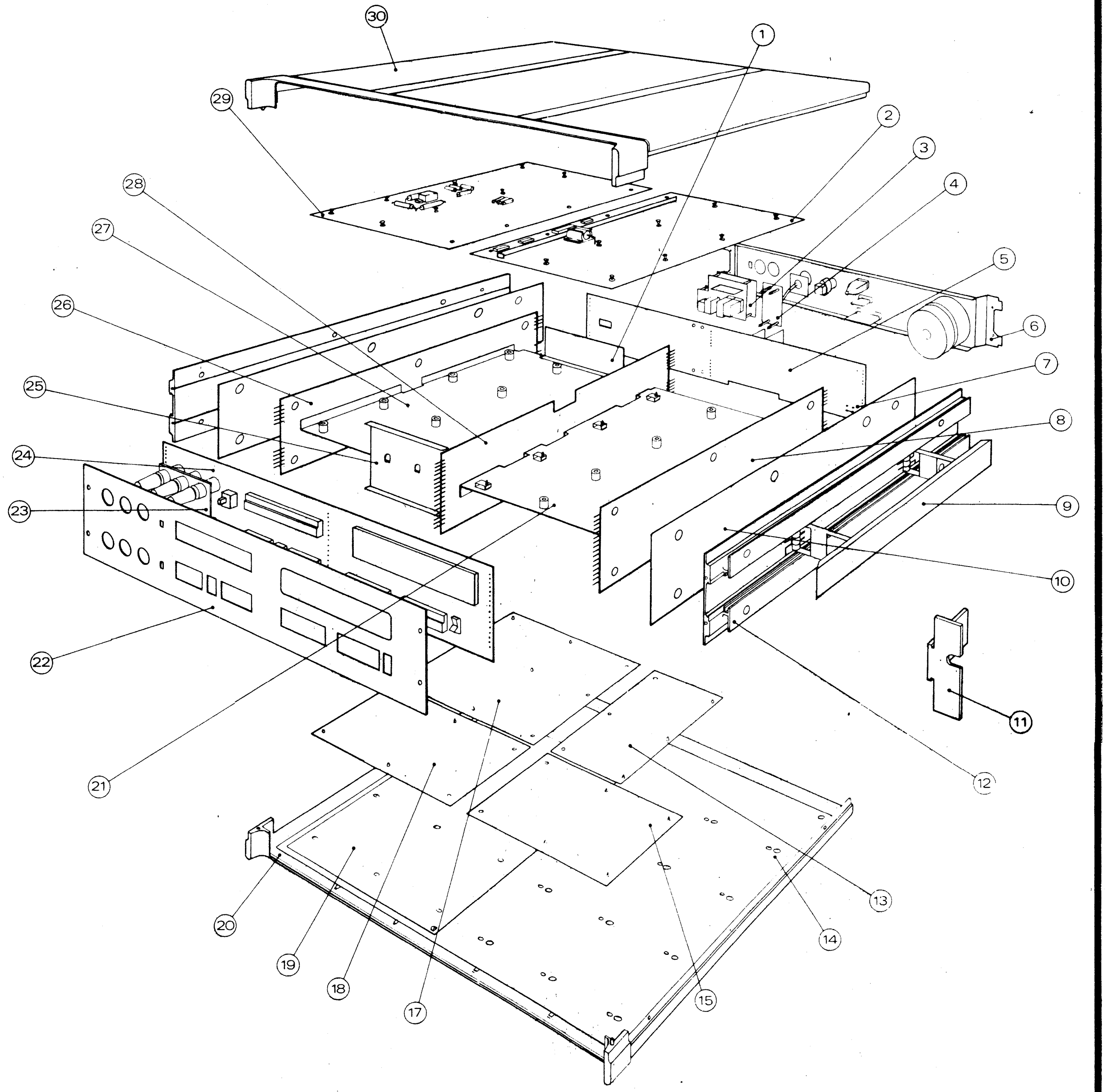
A printed key designation overlay adheres to the front panel trapping the polarising filter in front of the display. Both the front and rear panels are held together by two side extrusions running from front to rear. These side extrusions provide both slots for the handles or rack mounting 'ears' and locating points for the structural foam covers. The bottom cover is fitted with the tilt-stand, rubber feet and instruction card. Ground screening for the covers and guarding is provided by aluminium plates, heat-staked to the inside of the covers with electrical connections made by spring contacts.

2.5 INTERNAL CONSTRUCTION

An internal chassis is constructed from five printed circuit boards, held together by connectors at each corner and held rigid by two inner aluminium shields fixed horizontally on the instrument's centre line running from front to rear. Input terminals, switches and display are mounted on the front printed circuit board (pcb) and the power supply on the rear pcb. The two side and centre pcb's are used for interconnections between the main circuit boards.

All the main circuit boards are mounted on the inner shields with hinges and quick release fasteners with flexible connections to allow operation in the 'hinged-up' position. The Analog output circuitry is fixed on to the rear pcb of the chassis and the Ratio/Rear Input circuitry on to the rear panel. The options are mechanically fitted and require no soldering.

The chassis is mounted on to the side extrusions with nylon screws, spacers and an insulation sheet to ensure that the 'electrical spacings' of the UL, BSI and VDE specifications are achieved.



1. REAR GUARD SCREEN
2. DIGITAL ASSEMBLY
3. RATIO/REAR INPUT ASSEMBLY
4. ANALOG OUTPUT ASSEMBLY
5. REAR (POWER SUPPLY) PCB ASSEMBLY
6. REAR PANEL ASSEMBLY
7. POWER SUPPLY VOLTAGE SELECTION LINKS
8. R.H. PCB ASSEMBLY
9. HANDLE ASSEMBLY
10. INSULATION SHEET
11. RACK MOUNTING BRACKET
12. SIDE EXTRUSION
13. DIGITAL INTERFACE ASSEMBLY
14. GROUND SCREEN
15. DISPLAY DRIVER ASSEMBLY
17. AC ASSEMBLY
18. OHMS ASSEMBLY
19. OUTER GUARD SCREEN
20. BOTTOM COVER ASSEMBLY
21. R.H. CENTRE GUARD SCREEN
22. FRONT PANEL AND OVERLAY
23. TERMINAL SUPPORT PLATE
24. FRONT PCB ASSEMBLY
25. FRONT GUARD SCREEN
26. L.H. PCB ASSEMBLY
27. L.H. CENTRE GUARD SCREEN
28. CENTRE PCB ASSEMBLY
29. ANALOG ASSEMBLY
30. TOP COVER ASSEMBLY

FIG. 2.1 EXPLODED VIEW OF INSTRUMENT

SECTION 3

TECHNICAL DESCRIPTION

3.1 INTRODUCTION

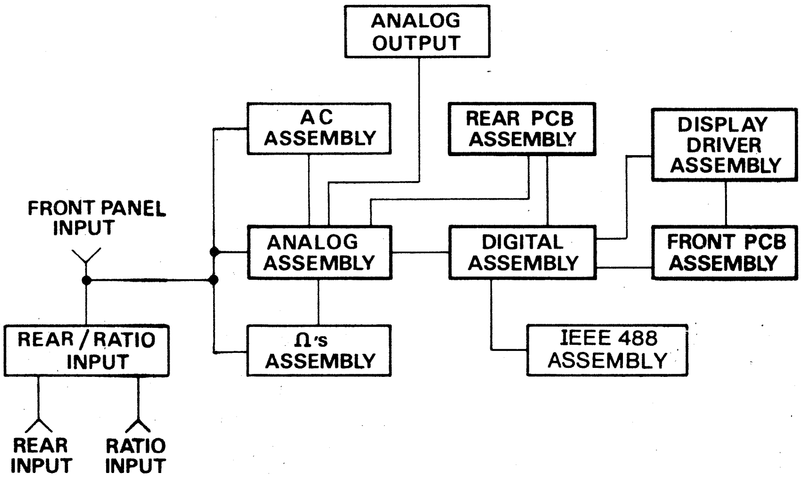

ANALOG OUTPUT
AC ASSEMBLY
REAR PCB ASSEMBLY
DISPLAY DRIVER ASSEMBLY
FRONT PANEL INPUT
ANALOG ASSEMBLY
DIGITAL ASSEMBLY
FRONT PCB ASSEMBLY
REAR / RATIO INPUT
Ω's ASSEMBLY
IEEE 488 ASSEMBLY
REAR INPUT
RATIO INPUT

FIG. 3.1 PRINTED CIRCUIT BOARDS BLOCK DIAGRAM

The internal circuits of the basic DC only instrument are divided between five printed board assemblies (shown in bold outline in Fig. 3.1).

For the purposes of explanation each assembly will be described separately and each assembly further subdivided according to the various functions involved.

3.2 ANALOG ASSEMBLY (Circuit Drawing No. 430503).

The Analog assembly is split into three distinct sections: (i) the Analog Interface, (ii) the DC Isolator and (iii) the Analog to Digital (A - D) Converter.

The Analog Interface receives data from the Digital assembly to control the selection of range, scaling and other features of the analog circuitry. Messages between the Analog and Digital assemblies are passed via opto-isolators, electrically isolating one from the other.

The DC Isolator includes the preamplifier, range scaling circuits and bootstrapped supplies. The A - D section converts the scaled input signal to a time period proportional to the signal using a modified triple slope technique.

3.2.1 Analog Interface (430503 sheet 5)

3.2.1.1 Introduction

The Analog Interface provides electrical isolation between the Digital and Analog circuitry. Latched data from the microprocessor is passed through opto-isolators, decoded and latched again on an analog assembly to select function, range, test, average and the D - A converter set up conditions. A line is also provided to instruct the micro-processor which options are present; for AC measurements, this line also indicates the frequency band of measured signals (up to 200Hz, 200Hz to 20kHz, or above 20kHz).

3.2.1.2 Power-On

At power-on the A - D converter is placed into the RESET condition (See Section 3.2.3.8). The analog circuitry is then interrogated to discern which options (if any) are fitted. Finally the analog circuitry is placed into the DC, 1000V range until a different range or function is selected (See Fig. 3.3).

To determine which options are fitted, the Digital assembly sends a series of messages across the isolation barrier, decodes them on the analog side and gates them with lines from the option assemblies to feed a signal back across the isolation barrier to the micro-processor.

Option checked	ID line low	Pin No. of M19 held low if Option incorporated
AC	ID 1	M19-3
Ω	ID 2	M19-11
RATIO	ID 4	M19-10

Fig. 3.2 POWER-ON OPTIONS FITTED TEST

Looking at the procedure in more detail, the Analog Interface Data (ID) lines are all set to a logic '1' except one, which is set to a logic '0', depending on the option being interrogated (See Fig. 3.2). As an example we will check to see if the AC option is fitted. ID1 is set low, the rest of the ID lines set high and the Analog Interface Address lines, IA0 and IA1 set low. The opto-isolators *invert* all signals, thus M17-3 is low and M19 pins 10, 4 and 11 are high. If the AC option is *not* fitted M19-2 is driven low via R55 from M17-3, causing M19-3 to be high, producing a logic '0' (-15 volts) on M18-4. If the AC option *is* fitted a 33kΩ resistor on the AC assembly (R15) overrides R55 and a high is placed on M19-2. The effect is to produce a high on M18-4, turning the opto-isolator M2-B on and thus COND. VAL (M2-8) is high, signalling to the Digital assembly that the AC option is fitted. Similarly, when the Ω or RATIO options are interrogated, the appropriate output of M19 is set low if the option is fitted causing the COND. VAL to be set high.

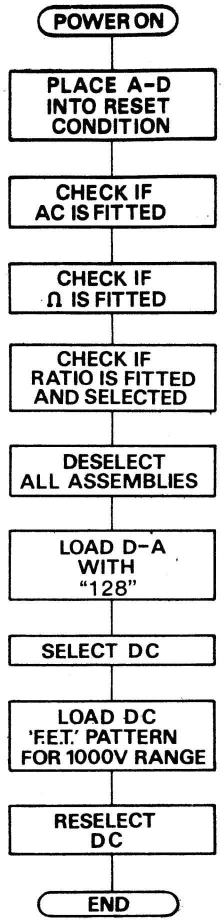


Fig. 3.3 ANALOG INTERFACE SEQUENCE: POWER-UP

*Note: ID and IA lines
logic '1' ≡ +5 volts   logic '0' ≡ 0 volts
AD lines
logic '1' ≡ 0 volts   logic '0' ≡ -15 volts

The next step in the power-up sequence as far as the analog circuits are concerned, is to be placed into the DC, 1000V range (See Fig. 3.3 Flowchart). Firstly, all assemblies are deselected by placing logic '1's on all the ID lines, then setting the IA0 and IA1 lines low (see Fig. 3.4), clocking the option select latches (M20 Analog assembly, M5 AC assembly, M9 Ohms assembly, M1 Ratio assembly) from M17-3. Both IA lines then return high. Secondly, the latches of the D - A converter (M13, M14) are set up to '128', the D - A mid-point value. The ID lines are set to the appropriate pattern and the information is clocked on to M13 and M14 by a delayed low to high edge from M17-4, originating from IA0 going low. The delay makes sure that the signal from M17-10 has disabled the "F.E.T." latch M21. Once again, the IA0 line returns to the resting state of logic '1'. Thirdly, the DC analog circuits are enabled by setting all the ID lines high except ID0, then

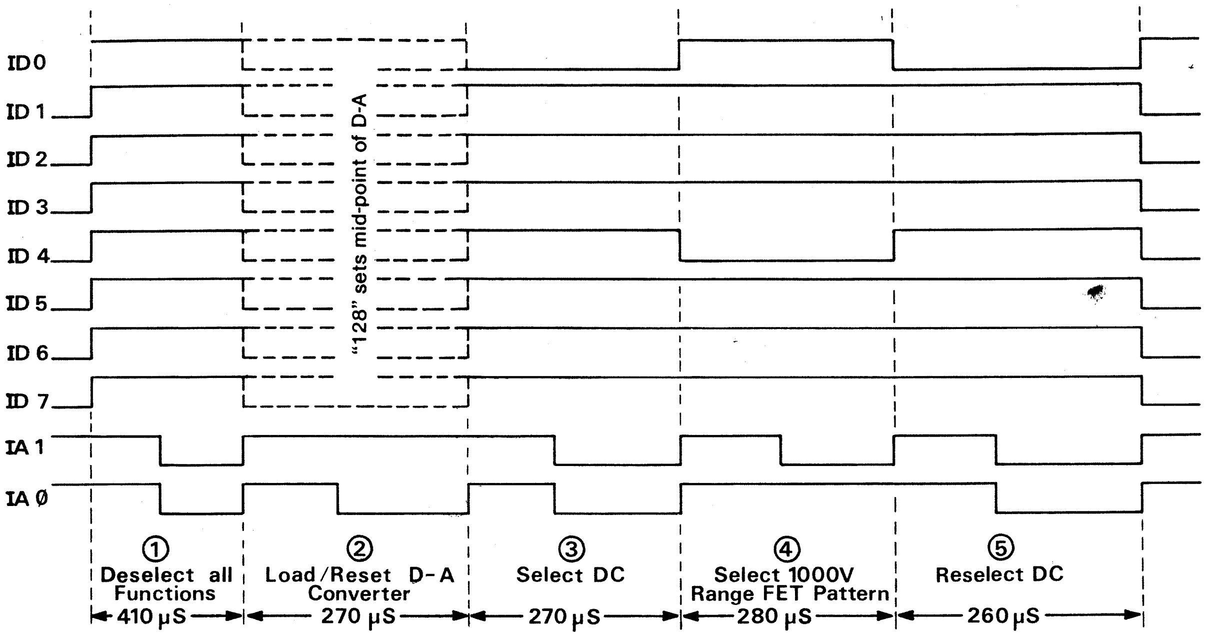


Fig. 3.4 ANALOG INTERFACE DATA LINE TIMING DIAGRAM (Power-Up)

clocking M20 by a low to high edge from M16-6 caused by both IA lines going low. Once DC has been selected, the F.E.T. pattern latch is enabled from M12-1, and the penultimate step is to load the latch with 1000V range data from the ID lines (ID4 low, the rest high). This is executed by clocking the 'F.E.T.' latch from M17-4 once again, but this time being due to IA1 going low. The final step is to reselect DC as described above.

3.2.1.3 General Interface Update Sequence

Before the start of each reading, the analog interface undergoes a complete update. The series of events is the same as the power-up sequence for selection of function and range, as can be seen by comparing the two flowcharts (Figs. 3.3 and 3.5). When Ohms is selected, the DC isolator is also used in the measurement procedure as seen in the following table.

Type of Measurement	Circuits Selected	Use of D - A
DC Volts	Analog Assembly	Linearity Calibration
AC Volts	AC Assembly	Frequency Compensation
AC + DC Volts	AC Assembly	Frequency Compensation
Resistance	Ohms Assembly and Analog Assembly	— — —

The update sequence order is (i) Deselect all assemblies, (ii) Load D - A latches, (iii) Select AC assembly or DC Isolator, (iv) Load range pattern into DC or AC range latches, (v) Deselect DC or AC and select the Ohms assembly (vi) Load range pattern into Ω's range latches, (vii) Reselect circuits selected in (iii) and (iv).

Note: Steps (v) and (vi) are used only when Ω is selected.

Flowchart 3.5 gives the above sequence for an ohms update. The general form of the timing diagram for the above sequence is given in Fig. 3.6, the analog 'F.E.T.' pattern for each range of each function being given in Appendix 1.

3.2.1.4 Test

When TEST is selected, a logic '0' is placed on ID7 at stages (iii), (v) and (vii) in Fig. 3.6, i.e. each time a funcion measurement circuit is selected. Appendix 1 lists the 'F.E.T.' pattern of each assembly for each test measurement cycle.

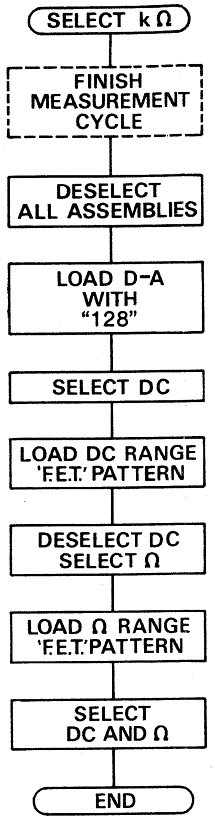

SELECT kΩ
FINISH MEASUREMENT CYCLE
DESELECT ALL ASSEMBLIES
LOAD D-A WITH "128"
SELECT DC
LOAD DC RANGE 'F.E.T.' PATTERN
DESELECT DC SELECT Ω
LOAD Ω RANGE 'F.E.T.' PATTERN
SELECT DC AND Ω
END

Fig. 3.5 ANALOG INTERFACE SEQUENCE: OHMS SELECT

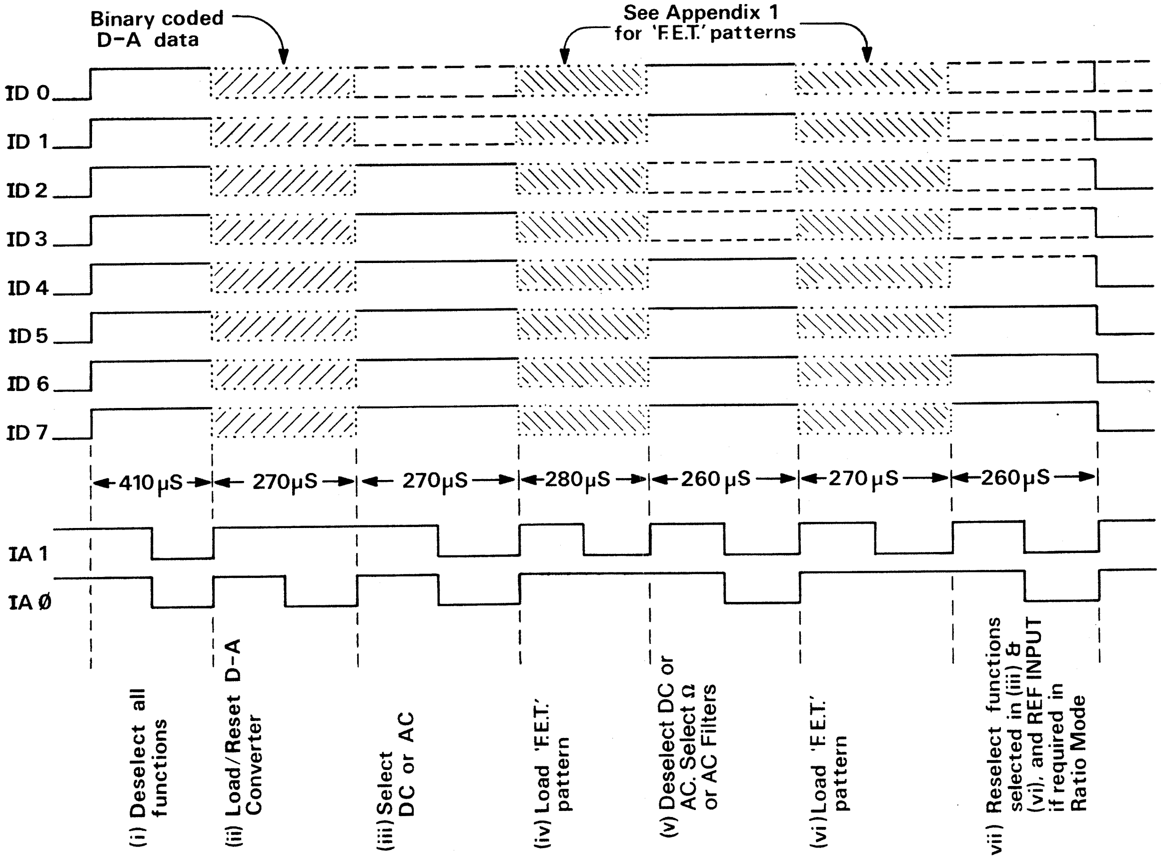

Binary coded D-A data
See Appendix 1 for 'F.E.T.' patterns
ID 0
ID 1
ID 2
ID 3
ID 4
ID 5
ID 6
ID 7
410µS
270µS
270µS
280µS
260µS
270µS
260µS
IA 1
IA Ø
(i) Deselect all functions
(ii) Load/Reset D-A Converter
(iii) Select DC or AC
(iv) Load 'F.E.T.' pattern
(v) Deselect DC or AC. Select Ω or AC Filters
(vi) Load 'F.E.T.' pattern
(vii) Reselect functions selected in (iii) & (vi), and REF INPUT if required in Ratio Mode

Fig. 3.6 GENERAL FORM OF ANALOG INTERFACE UPDATE TIMING DIAGRAM

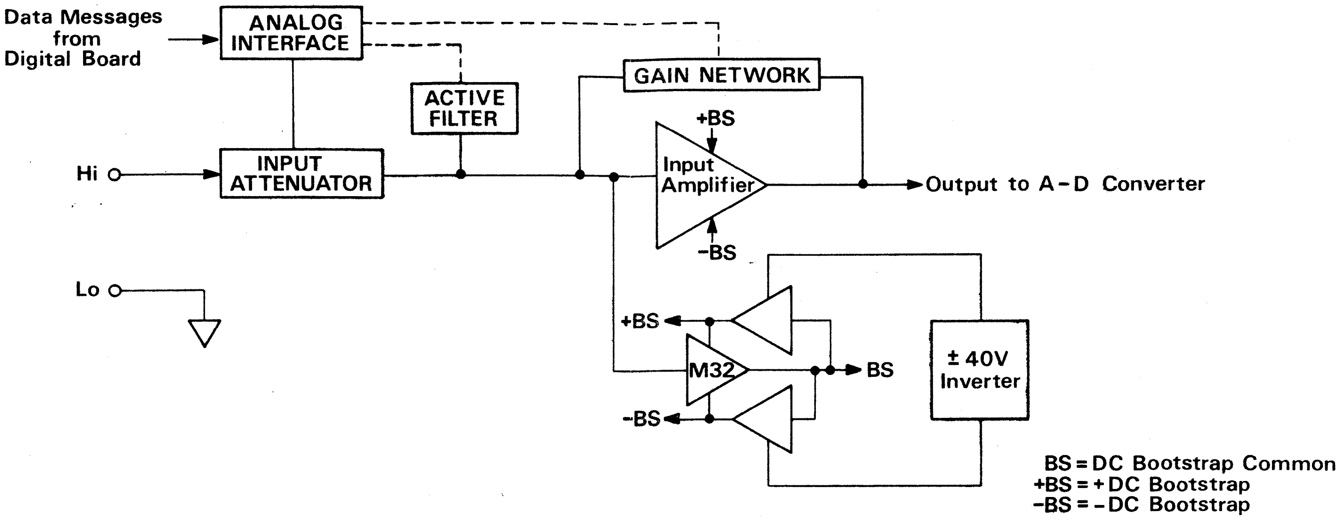

Data Messages from Digital Board
ANALOG INTERFACE
ACTIVE FILTER
GAIN NETWORK
+BS
Hi
INPUT ATTENUATOR
Input Amplifier
Output to A-D Converter
-BS
Lo
+BS
M32
BS
± 40V Inverter
-BS
BS = DC Bootstrap Common
+BS = + DC Bootstrap
-BS = - DC Bootstrap

Fig. 3.7 SIMPLIFIED DIAGRAM OF DC ISOLATOR

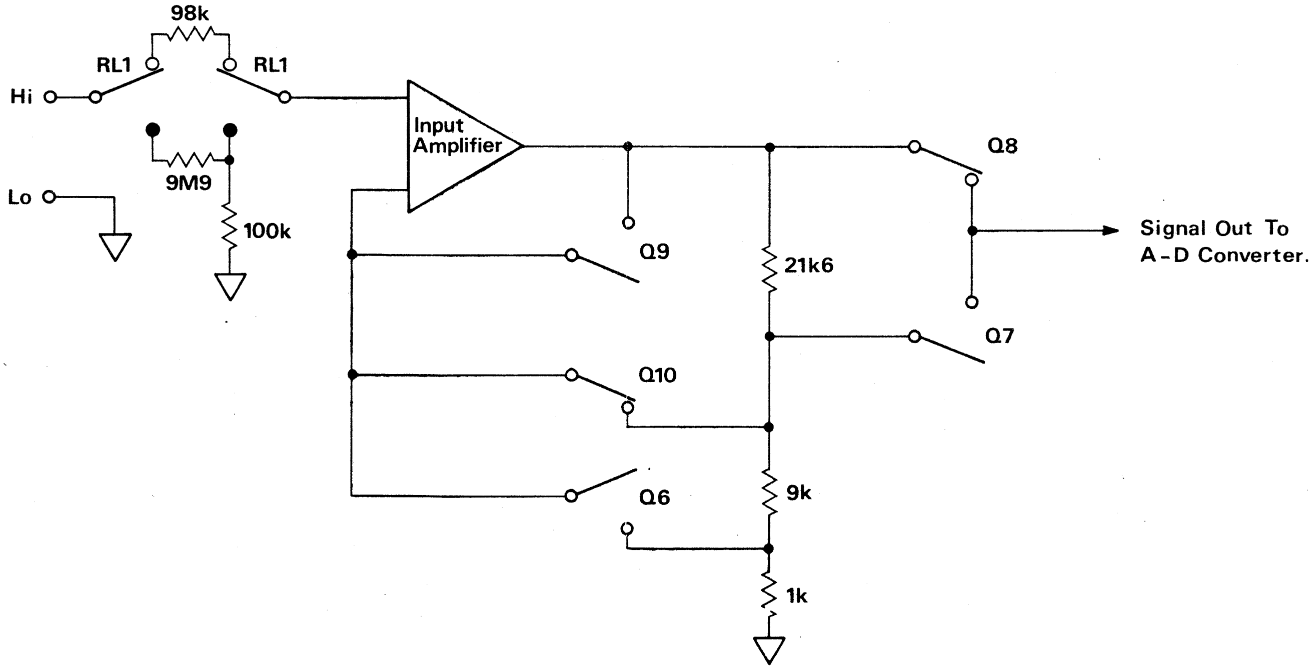

98k
RL1
RL1
Hi
Input Amplifier
9M9
Lo
100k
Q8
Q9
21k6
Signal Out To A-D Converter.
Q7
Q10
Q6
9k
1k

Fig. 3.8 SIMPLIFIED DIAGRAM OF ISOLATOR SWITCHING

3.3.2 DC Isolator Section

3.2.2.1 Preamplifier Scaling (430503 sheet 1)

Figure 3.8 shows the essential features of the isolator scaling circuit. For the purpose of explanation the same symbols are used regardless of whether the switching is accomplished electronically (F.E.T.) or by means of relay contacts. In Fig. 3.8 all switches are shown in the 1V RANGE position.

The various switching combinations for the different ranges are as follows:-

Range	Gain	Q6	Q7	Q8	Q9	Q10	RL1
100mV	x31.6	ON	OFF	ON	OFF	OFF	ON
1V	x3.16	OFF	OFF	ON	OFF	ON	ON
10V	÷3.16	OFF	ON	OFF	ON	OFF	ON
100V	÷31.6	OFF	OFF	ON	OFF	ON	OFF
1000V	÷316	OFF	ON	OFF	ON	OFF	OFF
DC		OFF	OFF	OFF	ON	OFF	OFF

The configuration of the circuit for each range is shown in Fig. 3.9.

Reference should be made to circuit diagram number 430503, sheet 1, for the complete circuit. Sheet 2 gives tables of the coding on the input control lines (from the Analog Interface).

When the 100V or 1kV range is selected, a ÷100, 10MΩ input attenuator (R143, R156, R149, R148) is incorporated into the circuit. This is a matched set of resistors for low temperature coefficient. The selection of a lower range energizes relay RL1 (via Q33), causing resistor chain R119-R122 to be in series with the Hi input. Should an overload signal then be applied, the resistor chain limits the current and the power dissipation is such that 1000V can be applied continuously.

The amplifier end of the resistors is clamped by zener diodes D22, D23 and Q18, Q19 to low, thus the amplifier input can never exceed approximately ±24 volts.

The output from the DC Isolator (test link TL B) is approximately 3.16 volts (≈ $\sqrt{10}$) for a full range (1000000) input. The Preamplifier gain circuits (see Fig. 3.9) operate as follows:

100mV Range	Q6 and Q8 are turned on; all other F.E.T.s are turned off and RL1 energized. Thus the output of the amplifier is connected to its inverting input via R108, R109, R110, R111 and Q6, an attenuator chain of ÷31.6, giving the amplifier an overall gain of x31.6. Q8 connects the preamplifier directly to the output.
1V Range	Q10 and Q8 are turned on, all other F.E.T.s are turned off and RL1 energized. The output of the amplifier is connected to its inverting input via R108, R109, R110, R111 and Q10, an attenuator

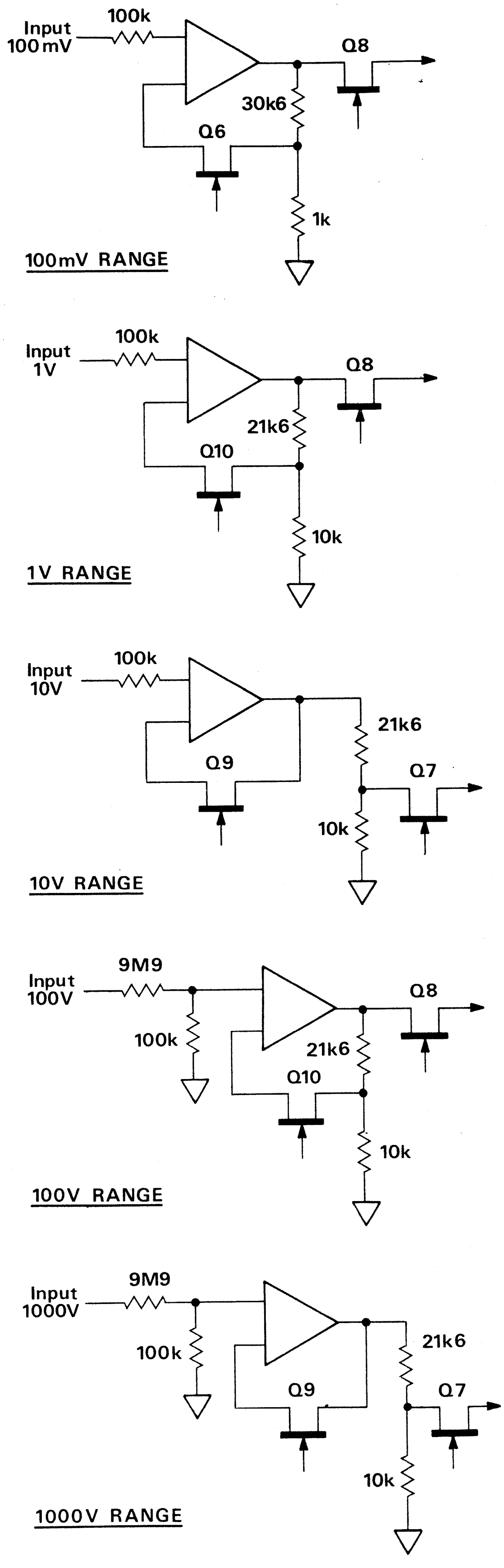


Fig. 3.9 PREAMPLIFIER GAIN CIRCUITS

	chain of ÷3.16,giving the amplifier an overall gain of x3.16. Q8, once again, connects the preamplifier directly to the output.
10V Range	Q9 and Q7 are turned on; all other F.E.T.s are turned off and RL1 energized. Q9 causes the amplifier output to be directly connected to its inverting input, giving a gain of unity. The output of the amplifier is attenuated by 3.16 (R114, R115) before being passed to the output via Q7 instead of Q8.
100V and 1000V Ranges	These two ranges select the 1V and 10V ranges respectively but a ÷100 attenuator (R149, R156, R143, R148) is inserted between Hi and the preamplifier input when RL1 is de-energized.

3.2.2.2 Preamplifier (430503 Sheet 1)

The preamplifier is designed to present an input impedance of greater than 10,000MΩ for signals up to ±20 Volts. It is also bootstrapped (tracking of both ground lines and supply lines with input signal), which is essential for correct operation of common mode rejection.

Q12 is a well-matched monolithic JFET pair exhibiting minimal voltage drift and low noise characteristics, the output being buffered by M31. A chopper-stabilized amplifier (M30) nulls the offset of Q12. Filter components R123 - R126, C30 and C42 eliminate the effects of current 'kickback' from M30 to the main signal path.

3.2.2.3 DC Bootstrap (430503 sheet 2)

Bootstrapping supplies are generated which track the input signal directly (BS), track the input signal with a positive offset of +12V (+BS) and track the input signal with a negative offset of −12V (−BS).

M32 is the high impedance buffer which tracks the inverting input of the preamplifier. The offset of M32 is adjusted so that its input is within 100μV of the input of the preamplifier. M32 thus functions as the low impedance rail (BS) following the input signal.

Selection of DC(M20-3) enables the capacitive inverter driven from M33 to provide the unregulated +42V(TLC) and −42V(TLD) supply from the ±15V supply.

The positive Bootstrap supply (+BS) is generated as a current source comprising Q26 and the shunt regulator, Q27, referenced to D50. When the output voltage of the regulator is approximately 1.2 volts above D50 cathode, Q27 conducts current into R175. Since the current in R175 is controlled to be constant by Q30, referenced to D50, the current flowing through R174 is reduced. Hence the supply current, "mirrored" in R173, is reduced and the output voltage controlled.

The negative bootstrap supply (−BS) is generated in a similar manner. Thus bootstrapped supplies of approximately ±12 volts are produced, tracking the input signal exactly.

3.2.2.4 Filtering (430503) sheet 1)

Selection of 'filter' causes an active filter to be switched in by relay RL2 (via Q32). The filter gives an attenuation of −54dB at 50Hz. The essential components of the filter are shown in Fig. 3.10.

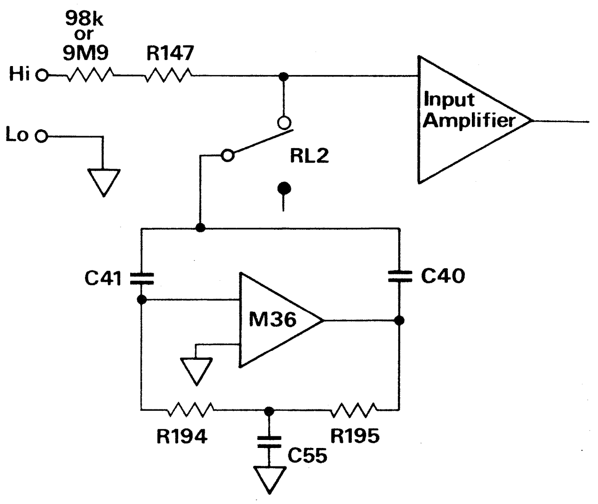


Fig. 3.10 SIMPLIFIED DC ISOLATOR FILTERING CIRCUIT

3.2.2.5 Test (430503 sheets 1 and 5)

During the self-test routine, (actuated from the front panel or remotely programmed) the DC isolator is checked for correct operation. The circuitry is placed into the 0.1V range, as described in 3.2.1.3, except that relay RL1 is not energized, (i.e. the ÷100 attenuator is across the input amplifier). Filter is selected and F.E.T. Q5 'closed' via M20-5 causing a small signal to be injected into the feedback path of the input amplifier. Thus a signal of −3.125 volts is output from the DC Isolator (TLB). This signal is then measured and compared with a stored value. If the measured signal is within ±6% of the stored value, the test continues with a 1V range check and a 10V range check.

Range	Output signal from DC Isolator (TLB)
0.1V	−3.125 volts
1V	−0.2193 volts
10V	+0.06932 volts

DC Isolator Output Test Voltages

3.2.3 Analog to Digital Conversion (Analog Section) (430503 Sheets 3 and 4)

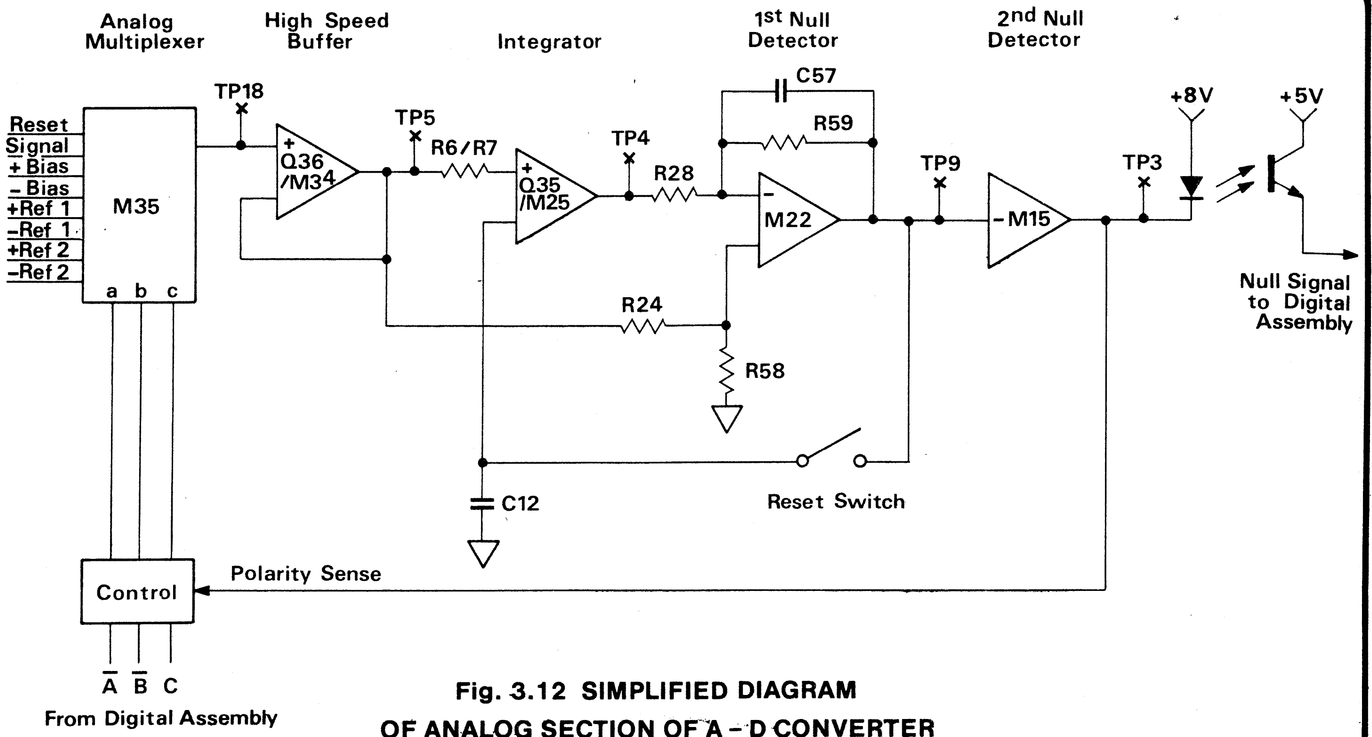

Analog Multiplexer
High Speed Buffer
Integrator
1st Null Detector
2nd Null Detector
TP18
TP5
TP4
TP9
TP3
C57
R59
R6/R7
R28
+8V
+5V
Reset
Signal
+ Bias
- Bias
+Ref 1
-Ref 1
+Ref 2
-Ref 2
M35
a b c
Q36 /M34
Q35 /M25
M22
-M15
R24
R58
Null Signal to Digital Assembly
C12
Reset Switch
Control
Polarity Sense
A̅ B̅ C
From Digital Assembly

Fig. 3.12 SIMPLIFIED DIAGRAM OF ANALOG SECTION OF A – D CONVERTER

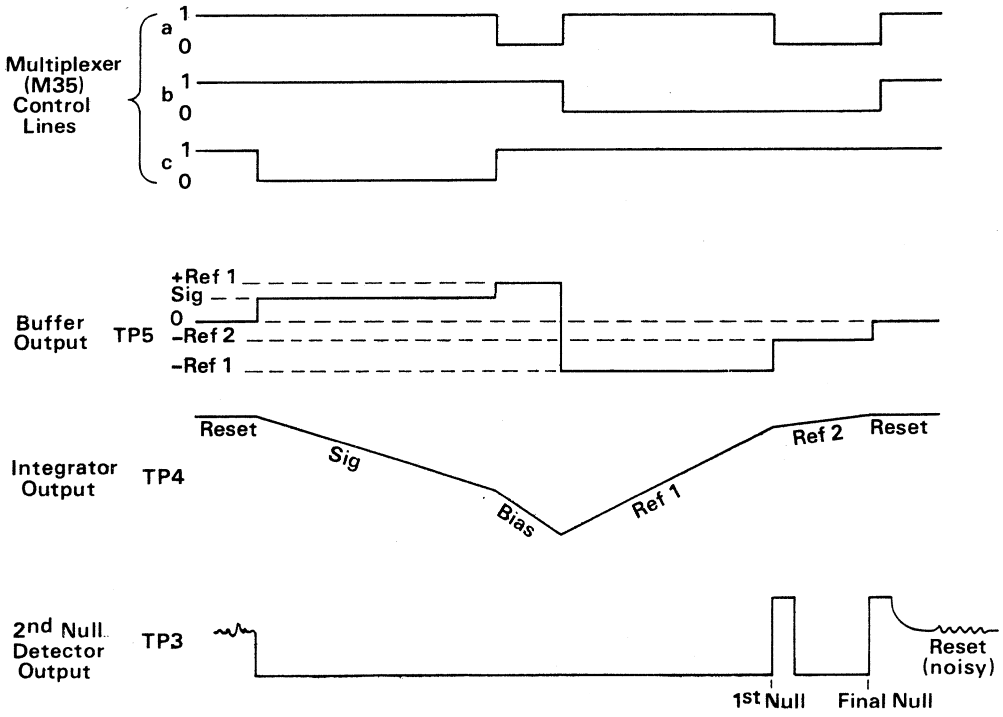

Multiplexer (M35) Control Lines
a
b
c
1
0
Buffer Output
TP5
+Ref 1
Sig
0
-Ref 2
-Ref 1
Integrator Output
TP4
Reset
Sig
Bias
Ref 1
Ref 2
Reset
2nd Null Detector Output
TP3
Reset (noisy)
1st Null
Final Null

Fig. 3.13 TIMING DIAGRAM FOR ANALOG SECTION OF A – D CONVERTER (Positive Signal)

Timing is not to scale, Bias & Ref. 2 periods being very short compared with Sig & Ref. 1

3.2.3.1 General Principles

Section 1 and Fig. 1.1 of the User's Handbook give a very basic description of the principles of the integration involved. The technique used in the Autocal Multimeter is a quadruple slope, the two extra slopes being towards the end of the signal and reference integration periods respectively.

Fig. 3.12 is a simplified diagram showing the essentials of the analog section of the A - D conversion and should be used with timing diagram Fig. 3.13 for full appreciation of the circuit operation.

3.2.3.2 A - D Input Control

The analog signal from the DC Isolator is applied to the analog multiplexer (M35) and fed to the input of the buffer (Q36/M34). This in turn feeds the signal to the integrator comprising Q35, M25 and C9.

Control of the multiplexer is derived from the Digital assembly via opto-isolators M4, M5 and M6. These signals control the sequence of events, allowing first the signal, then a bias voltage of the same polarity as the signal, followed by opposite polarity reference and reference ÷16 signals to the buffer and integrator. The multiplexer is then placed in a reset condition ready for the next measurement cycle. Fig. 3.14 gives the multiplexer control line sequence for both positive and negative signals.

STATE	a	b	c	STATE	a	b	c
RESET	1	1	1	RESET	1	1	1
SIG	1	1	0	SIG	1	1	0
+BIAS	0	1	1	−BIAS	0	1	0
−REF 1	1	0	1	+REF 1	1	0	0
−REF 2	0	0	1	+REF 2	0	0	0
RESET	1	1	1	RESET	1	1	1

Positive signal Negative signal

Logic levels : (0 ≡ −8V, 1 ≡ +8V)

Fig 3.14 MULTIPLEXER CONTROL LINE SIGNALS

3.2.3.3 Reference Voltages Supply (430503 sheet 4)

M39 senses the voltages from the two zener chains, setting the reference span across R44 and R45. This resistor pair is very tightly matched so that the positive and negative references track very closely. M40 is then used to balance the mid-point of R44, R45 to give the correct zero level.

3.2.3.4 High Speed Buffer

C22 slows the switching edges from the multiplexer M35 so that the buffer cannot slew-limit and thus lose the charge. The signals are fed to Q36, M34 which comprise a high speed buffer with high common mode rejection ratio (see Fig. 3.16). The common mode rejection is dependent on the power supplies of Q36 (from R66 and R11-R15) being bootstrapped to the output of the buffer, via D2 and D4. Thus the difference between input signal and power supply around the input stage is maintained constant whatever the input signal.

Q2 and Q3 boost the gain of Q36 by allowing the drains to see a high load resistance.

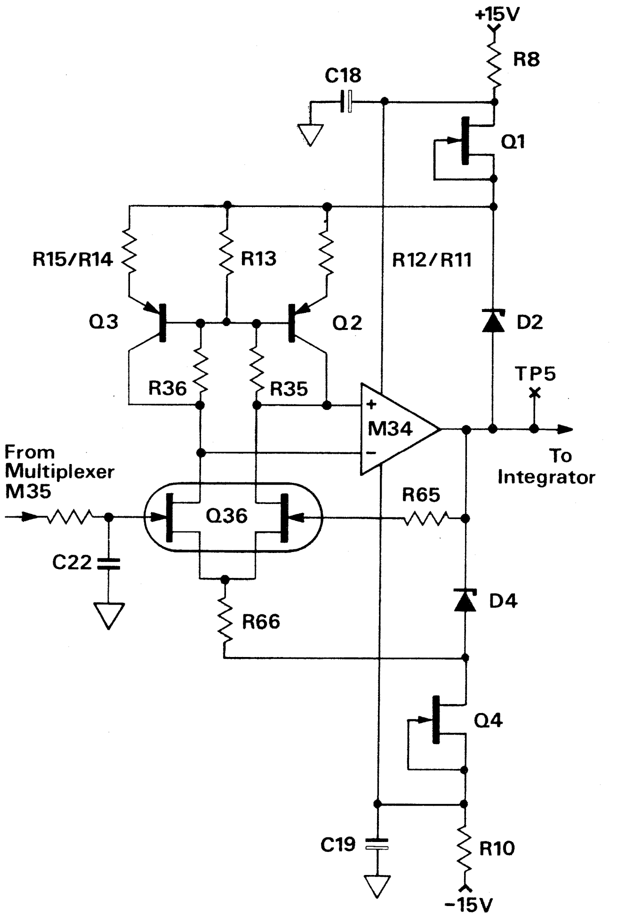


Fig. 3.16 HIGH SPEED BUFFER CIRCUITRY

3.2.3.5 Integrator

The basic Integrator comprises R6, R7 and C9, with hybrid amplifier Q35 and M25. (See Fig. 3.17). Low-noise FET-pair Q35 also has low gate leakage, which maintains the effectiveness of 'sample-and-hold' components R34 and C12.

An inverted and attenuated version of the integrator output voltage is developed across R5. This is applied via R4 and C10 to compensate for the small amount of dielectric absorption in C9. The value of R5 is factory-selected to equalize readings of the same input, taken at differing read-rates (including 'one-shot' measurements).

C11 and R27 provide shorter term compensation, R23 being set to correct linearity at 10% of full range.

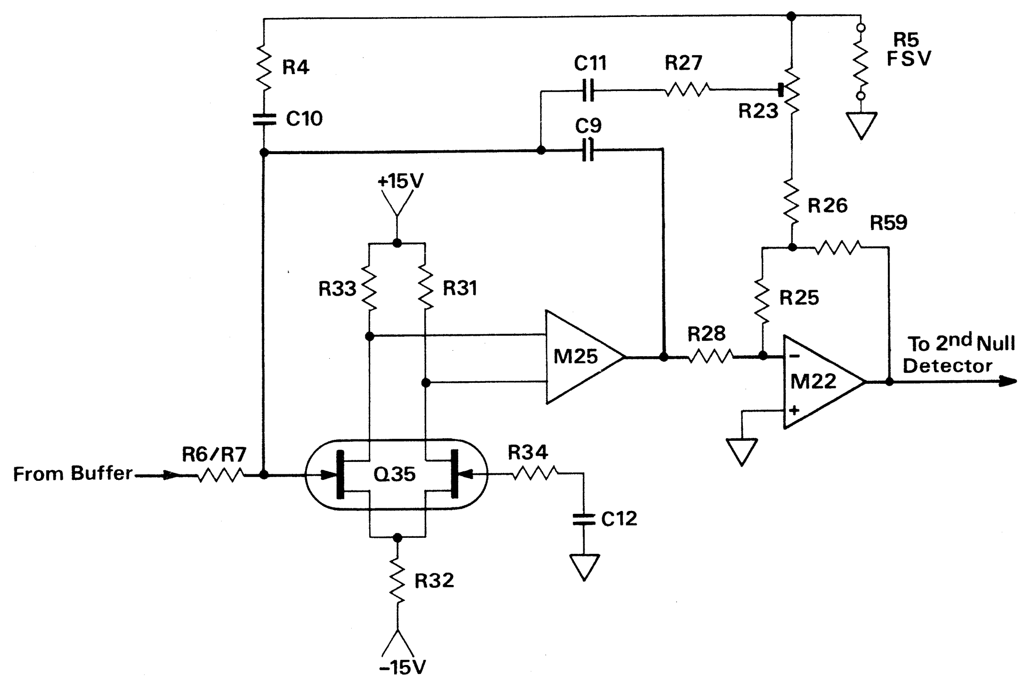

R4
C10
C11
R27
C9
R23
R5
FSV
+15V
R26
R59
R33
R31
R25
M25
R28
M22
To 2nd Null Detector
From Buffer
R6/R7
Q35
R34
C12
R32
-15V

Fig. 3.17 INTEGRATOR CIRCUIT

3.2.3.6 1st Null Detector

The 1st null detector comprises a low noise amplifier, M22, in an inverting configuration, where the DC gain is controlled by the ratio of R59 to R28 for small inputs. For larger inputs from the integrator the clamp diodes, D1 and D3, prevent the amplifier from saturating (Fig. 3.18).

During REF 1 the non-inverting input is offset by approximately 10mV to determine the point at which REF 2 is applied (after counting is synchronised). In REF 2 the offset reduces by a factor of 16 giving the null reference point.

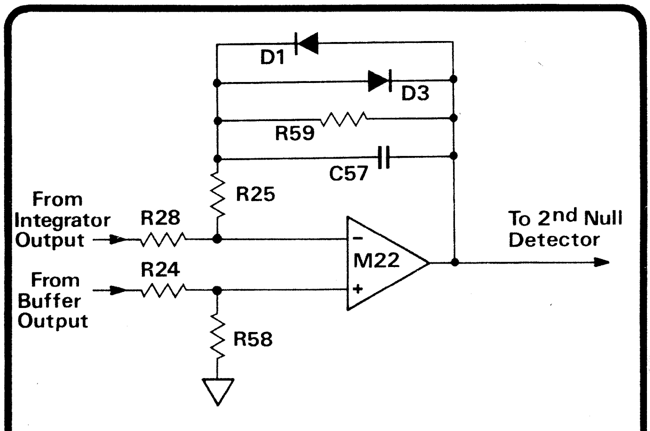

D1
D3
R59
C57
R25
From Integrator Output
R28
From Buffer Output
R24
M22
To 2nd Null Detector
R58

Fig. 3.18 1st NULL DETECTOR CIRCUITRY

3.2.3.7 2nd Null Detector

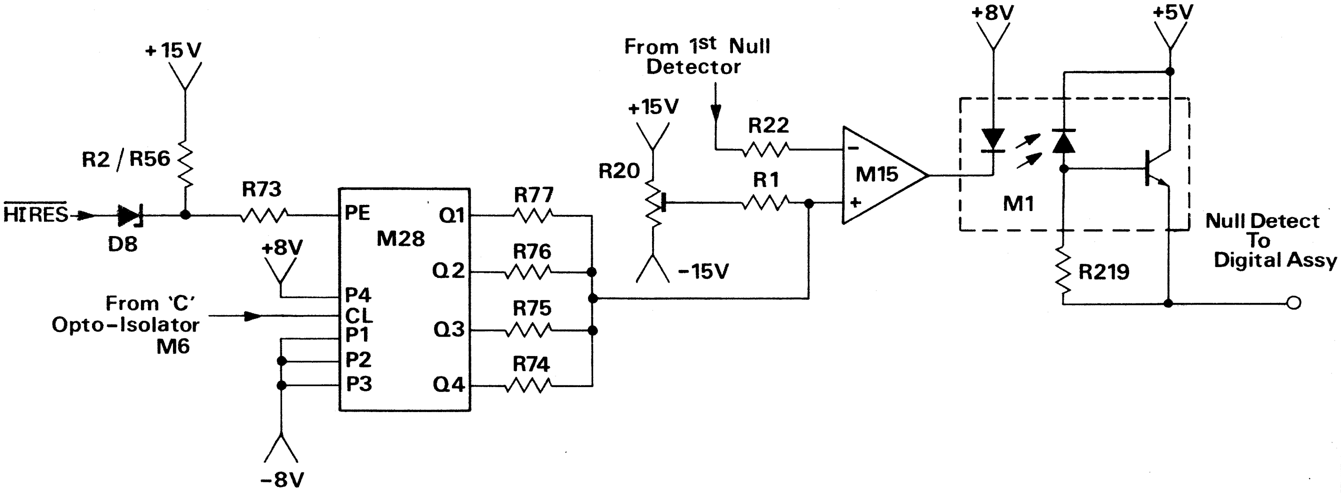
The signal from the 1st null detector is voltage-amplified by M15, providing a logic drive signal (NULL DET) via opto-isolator M1. The NULL DET signal is passed to the digital circuitry whenever a null condition changes (Fig. 3.19).

When in "High Resolution" (Hi Res mode, Zero or CAL selected), the input to the 2nd null detector is jittered by small increments of offset in a 16-measurement cycle (see Fig. 3.20). The offsets are generated by D-A converter M28, which is enabled by the level-shifted $\overline{\text{HI RES}}$ signal, and clocked from the 'C' control opto-isolator M6.

For each measurement in Hi Res mode, the displayed reading is the software average of the latest 16 offset measurements. Continuous cycling of the jitter ensures that a valid average is obtained at each measurement, allowing an extra digit of resolution to be displayed.

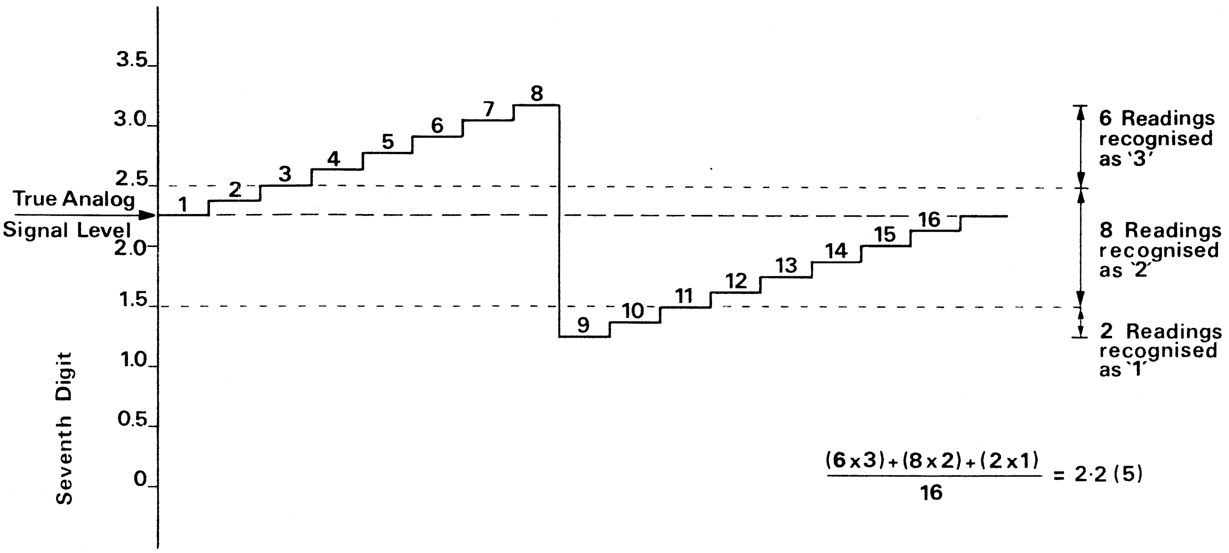
With Zero or CAL selected, one 16-measurement cycle only is averaged.

The 16-step jitter is not activated in 'Continuous' or 'Block' averaging modes.



+15V
R2 / R56
$\overline{\text{HIRES}}$
D8
R73
+8V
From 'C' Opto-Isolator M6
-8V
PE
M28
Q1
Q2
P4
CL
P1
P2
P3
Q3
Q4
R77
R76
R75
R74
From 1st Null Detector
+15V
R20
-15V
R22
R1
M15
+8V
+5V
M1
R219
Null Detect To Digital Assy

Fig. 3.19 2nd NULL DETECTOR CIRCUITRY



$$\frac{(6\times3)+(8\times2)+(2\times1)}{16} = 2{\cdot}2\,(5)$$

Fig. 3.20 DIAGRAM OF AVERAGING PROCESS

3.2.3.8 Reset Period

At the end of a measurement cycle or in hold, the circuitry is placed into a reset condition. The control lines of the multiplexer M35 allows the 0 volts reference input, at pin 4, to be connected to its output. (See Fig. 3.2.1). At the same time the reset line (M27-3) is taken high turning on M26. This reset signal, applied to pins 5 and 12 of M26 allows the output of the 1st null detector to be fed back via R60 to a sample and hold capacitor C12 on the integrator.

Thus, with the input to the A - D converter at zero volts, the charge stored on C12 is the sum of all the offsets from the multiplexer, buffer, integrator and 1st null detector, allowing the 1st null detector to indicate the true zero crossing (null) point.

The reset signal applied to M26 pins 6 and 13 merely allows a lower impedance path between the buffer and the integrator to speed up the settling time as C9 is discharged to zero.

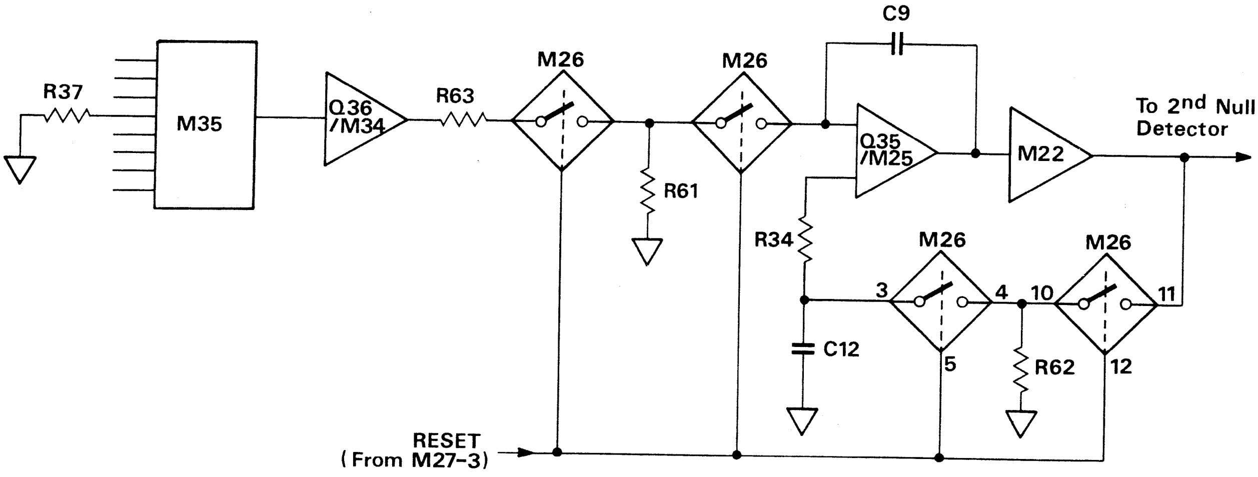

C9
R37
M35
Q36
/M34
R63
M26
M26
Q35
/M25
M22
To 2nd Null
Detector
R61
R34
M26
M26
3
4
10
11
C12
5
R62
12
RESET
(From M27-3)

Fig. 3.21 SIMPLIFIED DIAGRAM OF A - D DURING RESET PERIOD

3.3 AC ASSEMBLY (Circuit Diagram No. 430504)

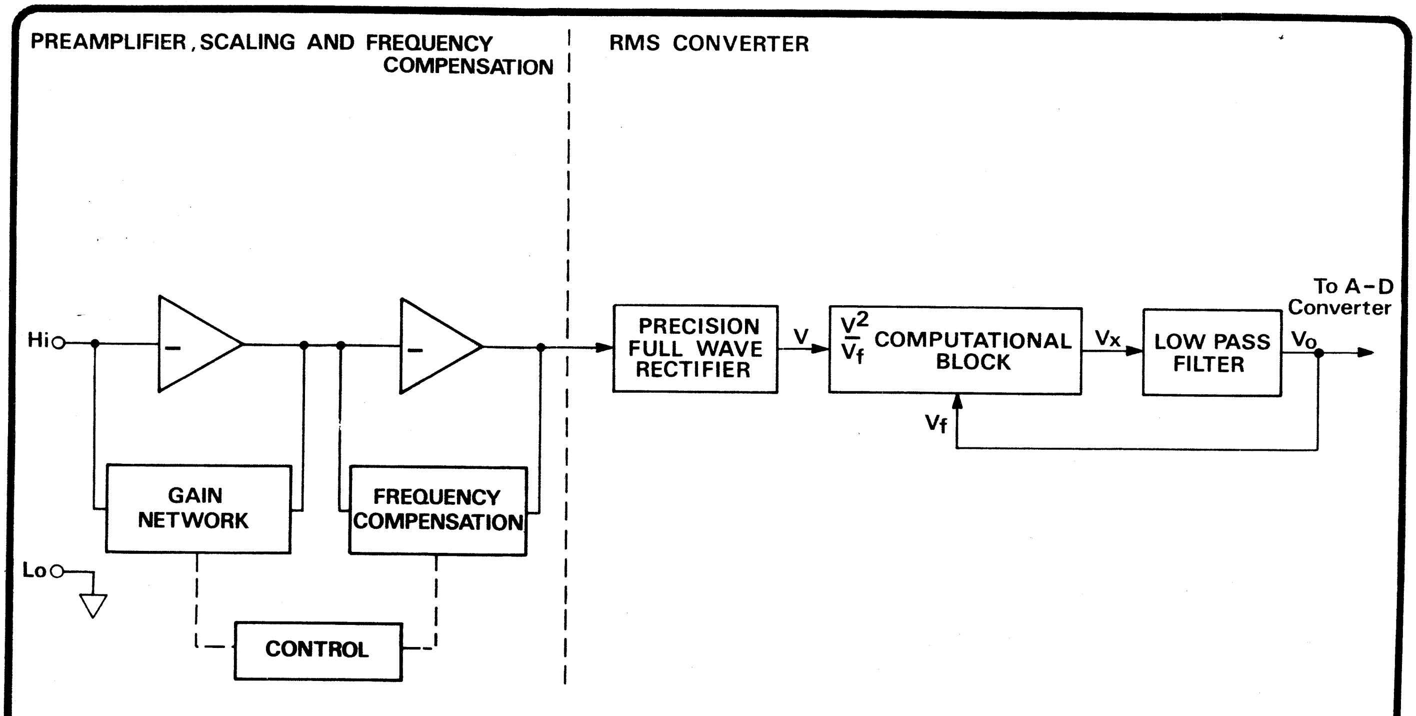

PREAMPLIFIER, SCALING AND FREQUENCY COMPENSATION
RMS CONVERTER
Hi
Lo
GAIN NETWORK
FREQUENCY COMPENSATION
CONTROL
PRECISION FULL WAVE RECTIFIER
V
V2/Vf COMPUTATIONAL BLOCK
Vf
Vx
LOW PASS FILTER
Vo
To A-D Converter

Fig. 3.22 **SIMPLIFIED DIAGRAM OF AC ASSEMBLY**

3.3.1 General Principles

The preamplifier buffers and ranges the signal in order to present 0.9 volts full range to the AC to DC converter section.

Once converted to an equivalent DC signal, it is applied to the analog to digital converter on the main analog assembly.

The conversion technique is electronic true RMS sensing as shown in the simplified block diagram Fig. 3.22. The Datron RMS module can be best considered as a functional block consisting of circuitry which accepts two inputs, V and V_f, computes V_2/V_f and has an output of V_o which is then filtered so that all the AC components are removed. The output of the block is fed back to V_f, thus closing the loop around the whole circuitry.

Mathematically: $\overline{V_x} = V_o$

but $V_x = V^2/V_f$

$\overline{V^2/V_f} = V_o$, but $V_o = V_f$

$\overline{V^2} = V_o^2$

i.e. $\underline{V_o = \sqrt{\overline{V^2}}}$

3.3.2 Preamplifier and Scaling (430504 Sheet 1)

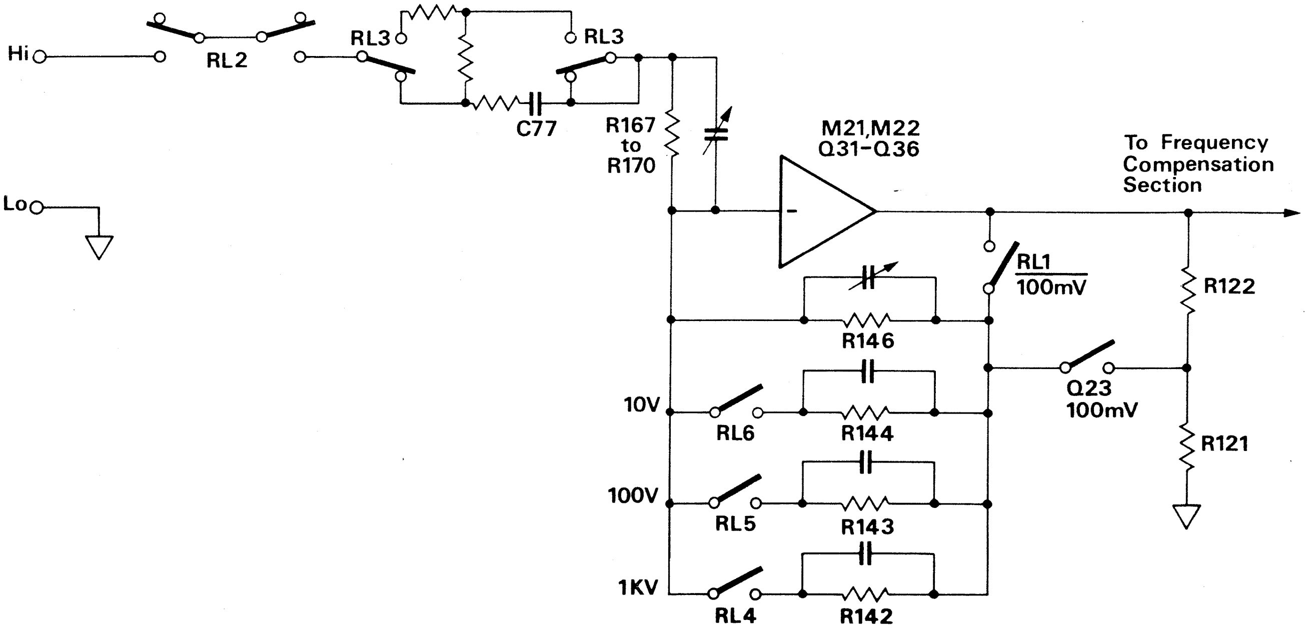


Fig. 3.23 SIMPLIFIED DIAGRAM OF THE AC PREAMPLIFIER SCALING

When the AC option is selected, the AC preamplifier is connected in parallel with the 1000 Volt range of the DC isolator. The resultant impedance presented at the input terminals is a resistance of 1MΩ, shunted by 150pF.

Relay RL2 is energized on selection of AC, directly connecting the Hi terminal to the input of the AC assembly. If DC and AC are selected together, the AC assembly becomes DC coupled by energizing RL3, causing C77, the AC coupling capacitor, to be by-passed.

The signal is then fed to the switched gain inverting preamplifier whose full range output is 0.9 volts r.m.s. A simplified diagram of this arrangement is shown in Fig. 3.23. The frequency response is held flat, to within ±1%, by controlling the gain defining component time constants, to a similar order of accuracy. Residual errors are removed by the frequency compensation stage. (See section 3.3.4).

The main amplifier M22 responds to signals from DC to above 1MHz. Its input buffer Q36 reduces bias current errors. A chopper-stabilized amplifier M21 nulls the offset of Q36. Filter components R123 and C90 eliminate the effects of current 'kickback' from M21 to the main signal path. M22 output (Test link TLK) is fed directly to the unity gain frequency compensation stage.

C88 and C89 decouple R160 and R162 except on the 100mV range, when Q33 and Q34 are switched off to provide greater open loop gain. To ensure stability at the higher feedback levels required for the 10V, 100V, and 1000V ranges; C73 is switched in by Q32 to decouple M22 non-inverting input, further reducing the open loop gain.

The unity gain frequency-compensation amplifier includes a stable DC path M20, and a fast AC path Q28 and Q29. The capacitance of varicap diode D14 is determined by the bias voltage at J1-11. The bootstrap circuit of Q17/Q21 ensures that both halves of the varicap are subjected to the same AC signal, removing the non-linearity of the voltage-capacitance characteristic.

3.3.3 RMS Converter (430504 Sheets 2 & 3)

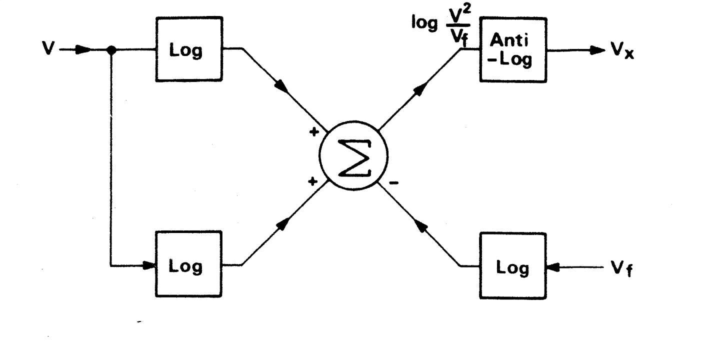


Fig. 3.25 BLOCK DIAGRAM OF RMS CONVERSION TECHNIQUE

The RMS converter takes the scaled AC signal and converts it to an equivalent DC signal suitable for Analog-to-Digital conversion. The technique used is Electronic True RMS Sensing as shown in the simplified block diagram Fig. 3.25.

M13 and M14 form a summing full-wave rectifier. The output of precision half-wave rectifier M13 is summed with the non-inverted signal at the input of M14, with a weighting of 2:1. This forces an accurately rectified full-wave current to flow in RMS module M11. Potentiometer R62 adjusts the rectifier symmetry to provide the same output for signals of either polarity.

The output current from the RMS module drives the low pass current-to-voltage converter M10/M3, which generates a nominal 0.5 Volts for a full range signal. (Note that M10, M9 and M4 are chopper-stabilized amplifiers to handle the low signal voltages).

M16 is the active element of a switched 3-pole Bessel filter. M15 and M17 switch the time constants, extending the overall low-frequency response down to 10Hz, 1Hz or 0.1Hz. (See Fig. 3.24).

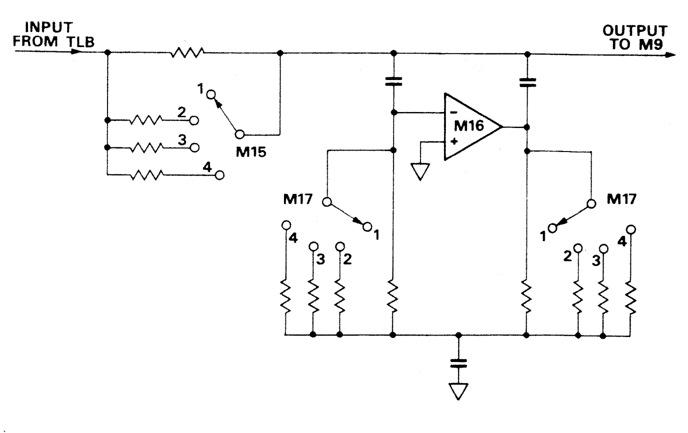


Fig. 3.24 SIMPLIFIED DIAGRAM OF AC FILTERS

The high impedance output from the 3-pole filter is buffered by M9/M2, and the other half of M2 provides a bootstrap for M9 input. R50 is set to null-out the bias current in M9 so that when R44 is dominant (0.1Hz filter selected), the bias current is negligible. D26 and D16 prevent the voltage on TL A from exceeding the +5V power rail, providing overload protection.

The buffer output voltage (3.12V full range) is developed across R52-R56 and R70, referred to Output Common at M4 input. Log-feedback stage M4/M3 closes the 'Square-Root' loop, providing feedback current for the RMS computation in M11.

When the AC, or DC-coupled AC option is selected, Q3 connects the buffer output to the Analog-to-Digital converter. Test links TLC, D, E and F are selectively removed at manufacture to set the correct output level.

3.3.4 High Frequency Compensation

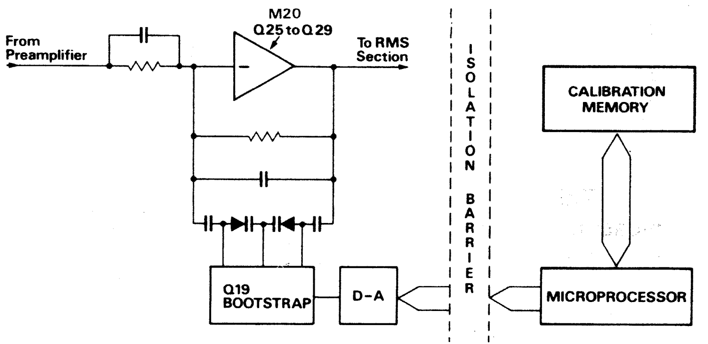


Fig. 3.26 SIMPLIFIED DIAGRAM OF AC HIGH FREQUENCY COMPENSATION

During the calibration cycle, the microprocessor notes and stores the high frequency (HF) error of each range. When AC volts is selected the compensation information for a particular range is recalled by the microprocessor, transferred across the isolation barrier and latched on to M13, M14 (Drawing No. 430503 sheet 5), see Fig. 3.26.

The output from the latches is applied to a digital-to-analog converter, AN2. The voltage produced is fed to the AC converter via connector J1 pin 11 and applied to varicap D11. The varicap is thus adjusted to give the amplifier chain a flat frequency response.

The calibration is carried out at one H.F. frequency but since it flattens the AC amplifier response, the correction is valid for all specified frequencies. It should be noted that the calibration routine is iterative since the varicap is non-linear.

3.3.5 Frequency Detection (430504 sheet 2)

The signal frequency is monitored by M18 and M19. Signals below 2kHz cause a logic-0 (−15V nominal) at pin 4 of both detectors. If the frequency is 2kHz or above, M18-4 rises to logic-1 (0V nominal), and if 20kHz or above, M19-4 also rises to logic-1. M18 and M19 outputs are open-drain FETs (logic-1 active).

For each AC measurement, the digital system sets F3 = logic-0, recording the logic state of J1-1 (HF FLAG). Then F3 is set to logic-1, and HF FLAG is recorded again. The result of this two-part test is interpreted by the digital system as shown in the table below:

HF FLAG states		Frequency Band
F3 = 0	F3 = 1	
0	0	f < 2kHz
1	0	2kHz ⩽ f < 20kHz
1	1	f ⩾ 20kHz
0	1	Excluded combination

This frequency information is retained until the next measurement and used to select the appropriate measurement uncertainty for display if 'Spec' is selected.

3.3.6 Test

During the self-test routine (actuated from the front panel or remotely programmed) the AC assembly is checked for correct operation. The circuitry is placed into the .1V range as described in Section 3.2.1.3. F.E.T.Q31 is 'closed' from M7-13 causing a signal of 0.08 volts DC to be injected into the preamplifier. Thus a signal of approximately 3.14 volts is output from the RMS section and applied to the A - D converter situated on the Analog assembly. This signal is then measured and compared with a stored value. If the measured signal is within ±6% of the stored value, the test continues with a 1V range check.

Range	Output from RMS section
.1	+3.14 volts
1	+0.314 volts

3.4 OHMS ASSEMBLY (Circuit Diagram No. 430505)

The instrument functions by measuring the voltage across an unknown resistance with a known constant current flowing in it. The converter can be split into two parts: a low-drift voltage follower, and a constant current sink covering 6 decades from 500nA to 10mA (see Fig. 3.27).

It should be noted that when the Ohms assembly is fitted, the DC Isolator Lo is no longer connected directly to the front/rear panel Lo terminal, but goes via RL1 on the Ohms assembly (connector link removed on side panel). Lo becomes an active terminal in resistance measurements.

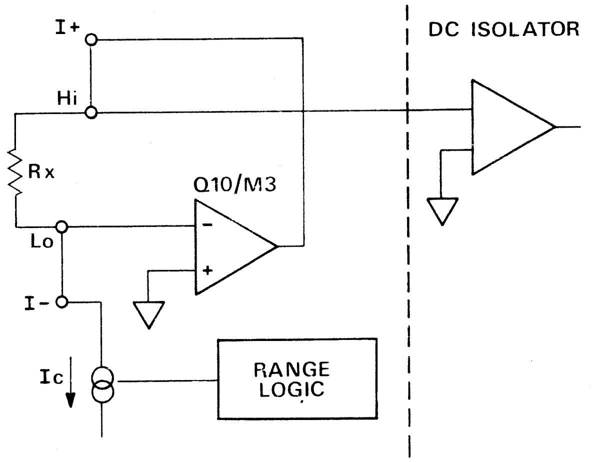


Fig. 3.27 **SIMPLIFIED RESISTANCE ASSEMBLY**

For 2-wire measurement, I+ is linked to Hi, I− to Lo, and the unknown resistance (Rx) is connected between Hi and Lo. The constant current Ic flows from its source at Q10/M3, along the path:

I+ → Hi → Rx → Lo → I−,

into its precision current sink.

The Lo terminal is maintained at Reference Common (0V). Therefore the Hi terminal (DC Isolator input) is held at [Ic x (Rx + lead resistance)] volts above Lo. The voltage measured by the DC Isolator is thus an accurate analog of the resistance of Rx and its connecting leads.

For 4-wire measurement, the resistance of the leads is eliminated by connecting I+ and Hi separately to one Rx terminal, with I− and Lo each connected separately to the other. In this case the voltage measured by the DC Isolator is an accurate analog of the resistance of Rx alone; as the voltage drop is sensed directly across Rx, and no current flows in the sensing leads.

The DC Isolator voltage measurement is scaled in software (effectively divided by the constant current value) to provide a direct reading in Ohms.

3.4.1 Low Drift Voltage Follower (430505 sheet 1)

When OHMS is selected, the front panel Lo terminal is connected to the inverting input of amplifier Q10/M3, with the non-inverting input referred to DC Isolator Lo (this remains Reference Common). Q10/M3, together with output follower Q13, apply a voltage to the I+ terminal such that the voltage at the Lo terminal is kept at 0V (Reference Common). The offset voltage of Q10 is removed by the use of the chopper-stabilized amplifier M10. Compensation network R26, R35, R68, R18 nulls out the small bias current of Q10 and M10.

Input protection is provided as follows:
Voltage/Current applied to input terminals
I+: R9, D10, D11, D15
I−: R2, D1, D2, Q20, Q21, R23.
Lo: R12, R13, Q8, Q9.
Open circuit voltage limit protection
I+: R15, R16, Q6, Q7.
I−: R6, D7, D8, Q2, Q22.

3.4.2 Constant Current Source (430505 sheet 1)

Seven decades of Ohms ranges are provided by 6 ranges of current (see Fig. 3.29), and 3 DC Isolator voltage ranges:

10Ω range and PRT	-	100mV
100Ω, 1kΩ, 10kΩ, 100kΩ ranges	-	1V
1MΩ, 10MΩ ranges	-	10V (5V full range)

Range	Current	F.E.T.s/Switches turned on	
		Current Selector	Leakage path
10Ω	10mA	Q11	M2(A)
100Ω	10mA	Q11	M2(A)
PRT	1mA	M1(A)	
1kΩ	1mA	M1(A)	
10kΩ	100μA	M1(B)	
100kΩ	10μA	Q4	M2(B)
1MΩ	5μA	M1(D)	Q3, M2(C)
10MΩ	500nA	M1(C)	Q3, M2(C)

FIG. 3.29 OHMS CURRENT RANGE SWITCHING

When kΩ is not selected, M2D is turned on, holding C8 charged up to approx 6V. When kΩ is selected, M2D switches off and Q17 (Sheet 2) is turned on, enabling astable M6 to produce a 200Hz signal to switch M5.

Thus when gates B and C of M5 are open, C9 is charged up from the negative reference (originating from the analog section of the A - D converter). These gates close, then A and B open, sharing the charge with C8 (sheet 1); the voltage across C8 soon equals the reference voltage.

The voltage developed across C8 causes M4 to sink current through resistor chain R24, R25, R29, R30, R31 until the voltage developed across the chain balances that across C8. Thus the current required for a particular range is selected by the value of the resistor chain switched by M1, M2, Q4 and Q11. Simplified diagram Fig. 3.30 shows the resistor chain and switching for each range. On the high resistance ranges leakage paths are provided by Q3, M2(B) and M2(C).

To produce good common mode rejection, M4 supplies are bootstrapped, the supply span being defined by a 13 volt zener, D17. The filtering bootstrap supplies (+ΩBS and −ΩBS) power the astable (M6) and bilateral switch M5.

The use of ohms guard permits in-circuit measurement of resistors, provided shunt paths are greater than 250Ω and a suitable tapping point is available. Consider Fig. 3.31. Guard is reference 0, Lo is actively maintained within microvolts of reference 0 (as previously explained). Thus there is no voltage across Rz and consequently no current in Rz. Voltage follower Q10/M3 will simply pass more current into Ry from the I+ terminal until the selected current for the particular range flows through Rx.

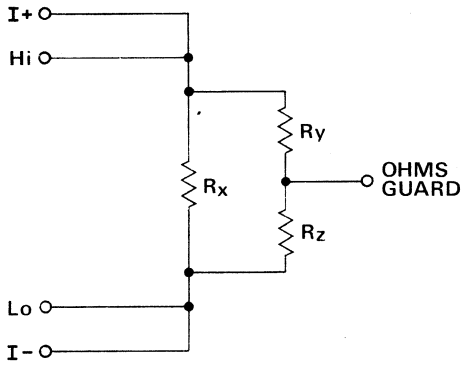


Fig. 3.31 USE OF OHMS GUARD

3.4.3 Test

During the self-test routine (actuated from the front panel or remotely programmed), the Ohms Converter is checked for correct operation. The circuitry is placed into the 10MΩ range as described in Section 3.2.1.3. Filter is selected and FET Q5 'closed' from M9-1 causing R8 (9.76kΩ) to be placed between I+ and Lo. 2-wire must be selected on the front panel (Error 6 occurs during self-test if this is not done).

M1C is on so 100μA flows through it. Since Lo is maintained at 0V there is no potential difference across either R1 or R3. Therefore all the current flows in R8 generating approximately 1V on I+ and Hi. The resulting voltage output from the DC Isolator is applied to the A - D converter, measured and compared with the stored value. If the measured value is within ±6% of the stored value, the test is complete.

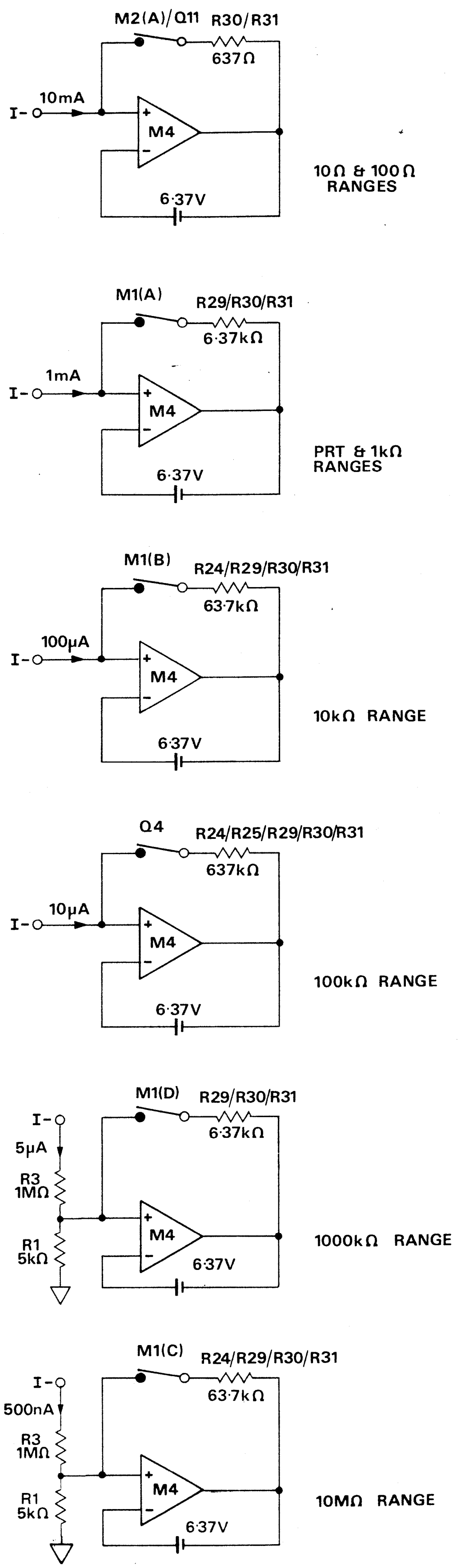

M2(A)/Q11
R30/R31
637Ω
I-
10mA
M4
6·37V
10Ω & 100Ω RANGES
M1(A)
R29/R30/R31
6·37kΩ
I-
1mA
M4
6·37V
PRT & 1kΩ RANGES
M1(B)
R24/R29/R30/R31
63·7kΩ
I-
100μA
M4
6·37V
10kΩ RANGE
Q4
R24/R25/R29/R30/R31
637kΩ
I-
10μA
M4
6·37V
100kΩ RANGE
M1(D)
R29/R30/R31
6·37kΩ
I-
5μA
R3 1MΩ
R1 5kΩ
M4
6·37V
1000kΩ RANGE
M1(C)
R24/R29/R30/R31
63·7kΩ
I-
500nA
R3 1MΩ
R1 5kΩ
M4
6·37V
10MΩ RANGE

Fig. 3.30 SIMPLIFIED Ω CURRENT SWITCHING

3.5 REAR INPUT/RATIO ASSEMBLY (Circuit Diagram No. 430506)

3.5.1 General

The Rear Input/Ratio assembly contains switching circuitry which selects the input to be measured — from one of 3 channels:

Front panel terminals	J6 on Rear Input/Ratio pcb
SIG socket	J11 on rear panel
REF socket	J10 on rear panel

A user makes the selection either remotely, using IEEE codes I or P (see User's Handbook Table 4.4); or from the front panel, using the MODE keys:

'Sig' selects inputs from J11 (SIG) only.
'Ref' selects inputs from J10 (REF) only.
'△' or 'Ratio %' (or both) provides a continuous series of readings, each processed digitally from two measurements: the first from J10 (REF) and the second from J11 (SIG). The Rear Input/Ratio assembly therefore alternates between J10 and J11 under software control.

Switching information enters the Rear Input/Ratio assembly via J2, to be latched by M1, which sets the input conditions for relay driver transistors Q1, Q2, Q5, and Q6. Relays RL1 and RL4 switch the Hi and I+ input lines, RL2 and RL3 switch Lo, I−, Guard and Ohms Guard.

3.5.2 Front Panel/Rear Panel Switching

To select the front terminals, AD6 is set to logic-1 (M1-9 at 0V) and the positive-going edge of 'OP SEL CLK' clocks M1-11. M1-13 is latched at logic-1, turning on Q1 and Q6, energizing relays RL1 and RL2. Thus the front input terminals are connected to the internal measurement circuits. Should 'Rear' input, 'Ratio %' or '△' be selected, AD6 is clocked into M1 as logic-0 (M1-9 at −15V). M1-13 is latched at logic-0, Q1 and Q6 are turned off, so the contacts of relays RL1 and RL2 permit RL3 and RL4 to select between the two rear inputs.

3.5.3 SIG/REF Switching

To select REF (J10), AD6 is at logic-0 (see para 3.5.2), AD4 is set to logic-1 (M1-5 at 0V) and the positive-going edge of 'OP SEL CLK' clocks M1-3. M1-1 is latched at logic-1, turning on Q2 and Q5, energizing relays RL3 and RL4. Thus J10 is connected to the internal measurement circuits. Should SIG (J10) be selected, AD4 is clocked into M1 as logic-0 (M1-5 at −15V). M1-1 is latched at logic-0, Q2 and Q5 are turned off, so relays RL3 and RL4 connect J11 to the measurement circuits.

3.5.4 Ratio %, △, or △ % Selection

For these mode selections, M1-13 remains at logic and the logic state of M1-1 is reversed during the last part of each analog interface update sequence (see Fig. 3.6). As a result, relays RL3 and RL4 alternately select J10 (REF) and J11 (SIG) inputs.

3.5.5 Hi and I+ Delays

To avoid excessive slew-rates in the measurement circuits, the Hi and I+ line switching is delayed by components in the base circuits of Q5 and Q6. This allows the input commons and guards (RL2 and RL3 contacts) to assume their correct potentials slightly before Hi and I+ are applied.

3.5.6 Test

When TEST is selected, a check is carried out to see if the Rear Input/Ratio option is fitted. R9 holds the AD4 line at logic-1 (0V) for the 'Option fitted' test (refer to sect 3.12).

3.6 ANALOG OUTPUT ASSEMBLY (Circuit Diagram No. 430308)

3.6.1 General

The Analog Output Assembly accepts the DC Isolator or AC Converter output and converts it to a ±1 volt DC full range output. This signal can then be used, for example, to drive X-Y plotters or strip chart recorders.

3.6.2 Description

The 3.16 full range signal from the DC Isolator to AC Converter is buffered by unity gain amplifier M2. The output is potentially divided by R7 and R8 so that 1 volt full range is presented to M1, another unity gain amplifier. Potentiometer R5 is adjusted to remove any offset caused by M1 and M2. Positive temperature coefficient thermistors R3, R4 and diodes D1, D2 protect the analog output circuitry from accidental input applied to the Analog Output external connector.

3.7 DIGITAL ASSEMBLY (Circuit Diagram No. 430526)

The Digital assembly contains the digital section of the A - D converter, and the circuitry which provides the gene management of the instrument. Fig. 3.33 outlines the main elements and signal highways of the digital system.

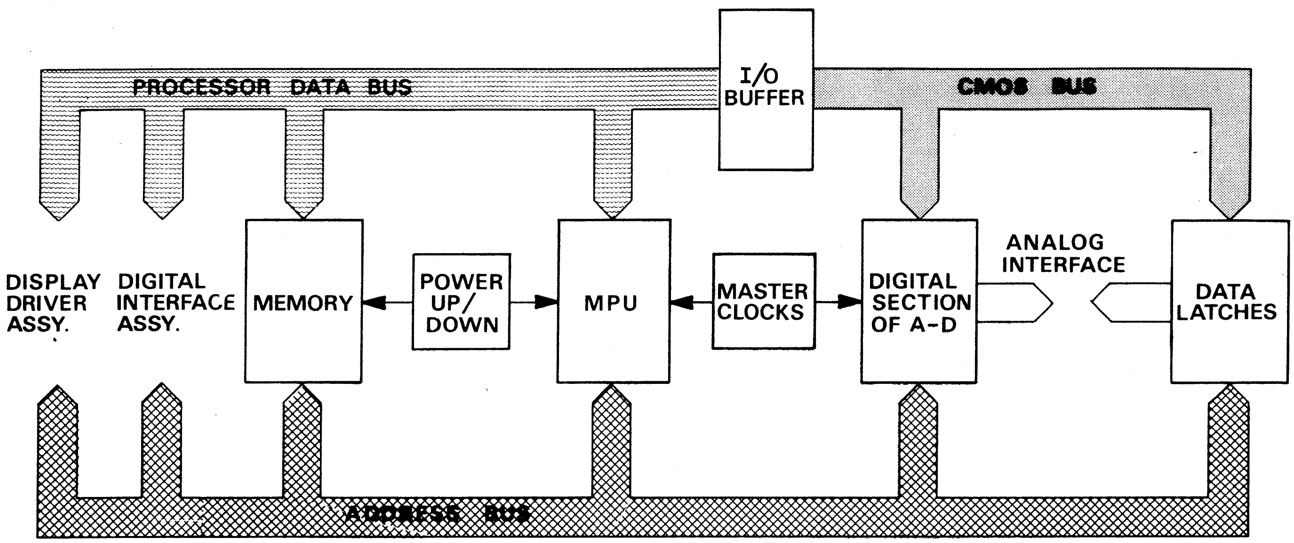


Fig. 3.33 **SIMPLIFIED BLOCK DIAGRAM OF DIGITAL ASSEMBLY**

3.7.1 Processor and Memory (430526 sheet 1)

A 6800 general-purpose microprocessor (MPU) together with 16k-bytes of memory controls the communication between the digital and analog assemblies, front panel, digital interface and display drivers. The memory can be split into three main areas:

a. Program Memory: Stored in 12k-bytes of ROM, this defines the 6800 MPU processes for control of the 1081 DMM. The ROM also contains constant data such at self-test limits, 'Spec' readout specifications and other fixed factors.
b. Non-volatile Calibration Memory: 256 bytes of RAM backed up by an internal battery, this stores the calibration errors used for each reading (updated during any 'AUTOCAL' or 'ZERO' operation).
c. Operating Memory: 1k-bytes of RAM store any intermediate calculation results, the DMM status, Max/Min and limit values, etc. A separate RAM on the Front Assembly holds volatile display data. No battery back-up is provided, so all this data is lost when the instrument is powered down.

3.7.1.1 Software Overview

The system uses the technique of a looping prioritized job scheduler (see Fig. 3.34). Each job driven from the scheduler is controlled by a flag in the system workspace which is set when the job is required to be run and cleared when completed. Priority of activation is ensured by making each job exit on completion, to the top of the schedule.

Program Modules: The program memory is split into a series of functional modules, each module corresponding fairly closely to a major functional area and hence to one of the jobs activated by the job scheduler, the larger ones being sub-divided, see Drawing No. 890043.

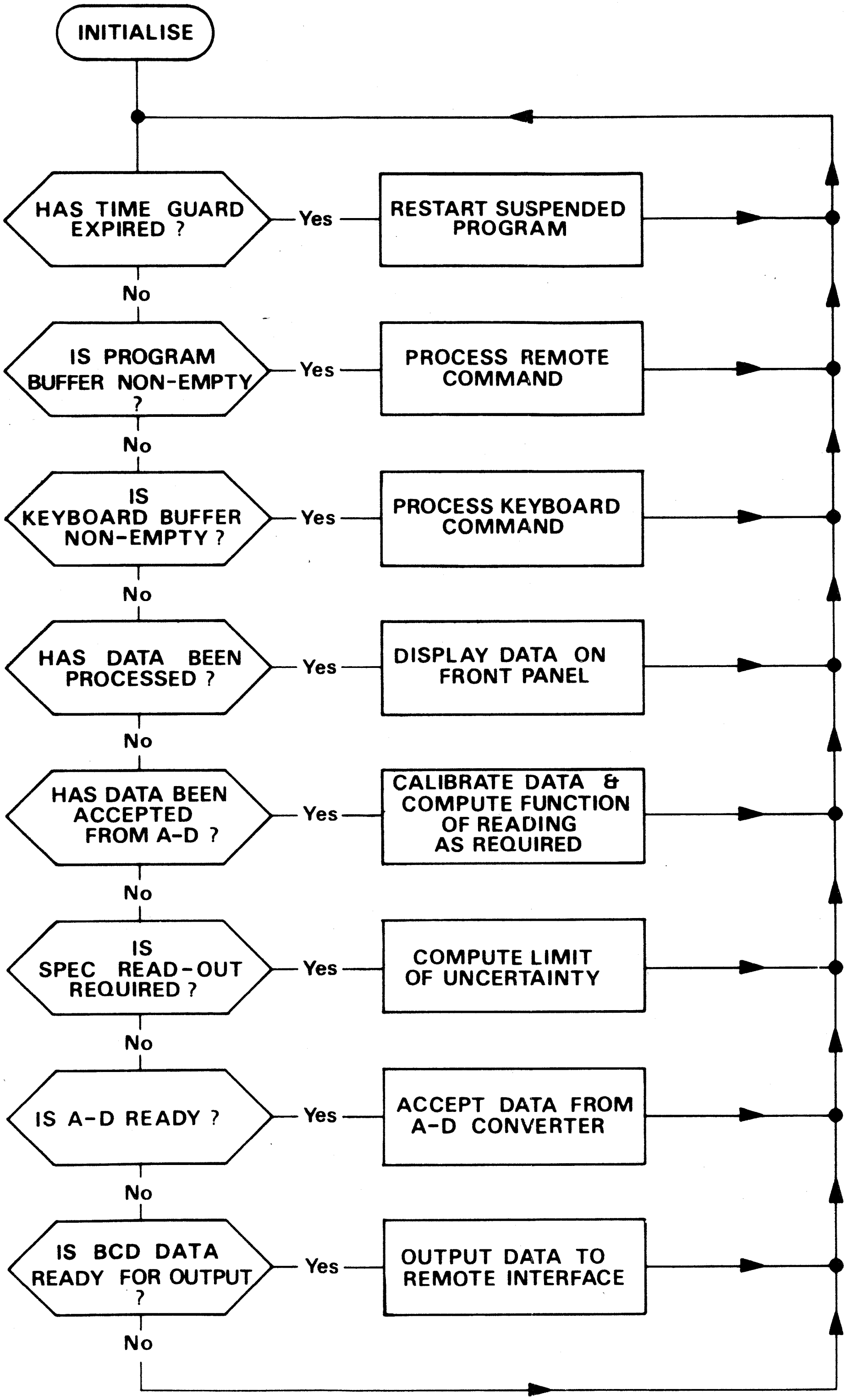

INITIALISE
HAS TIME GUARD EXPIRED ?
Yes
RESTART SUSPENDED PROGRAM
No
IS PROGRAM BUFFER NON-EMPTY ?
Yes
PROCESS REMOTE COMMAND
No
IS KEYBOARD BUFFER NON-EMPTY ?
Yes
PROCESS KEYBOARD COMMAND
No
HAS DATA BEEN PROCESSED ?
Yes
DISPLAY DATA ON FRONT PANEL
No
HAS DATA BEEN ACCEPTED FROM A-D ?
Yes
CALIBRATE DATA & COMPUTE FUNCTION OF READING AS REQUIRED
No
IS SPEC READ-OUT REQUIRED ?
Yes
COMPUTE LIMIT OF UNCERTAINTY
No
IS A-D READY ?
Yes
ACCEPT DATA FROM A-D CONVERTER
No
IS BCD DATA READY FOR OUTPUT ?
Yes
OUTPUT DATA TO REMOTE INTERFACE
No

Fig. 3.34 JOB SCHEDULER

Data Control: Data handled by the system consists of a stream of measurement information on which a number of operations are carried out. A second stream, asynchronous with the first, consists of commands derived from the front panel or digital interface, controlling both the measurement circuits and computation programs. Operations on the measurement stream basically consist of acquiring the raw data from the A-D converter, calibrating this data and carrying out any other computations, and converting and formatting the data for output. Note that a job consuming data is given higher priority than the one producing data for it, allowing a producer to place data into an empty buffer. The consumer is activated by a flag, set by the producer to indicate data ready in the buffer.

Process Control: Control of the instrument by the processor, initiated from the front panel or digital interface, is arranged by using a 'pipeline control' of the major system state and a 'first in/first out' buffer between the interrupt level routine receiving the control command and the main program implementing it. The major system state consists of the range, function, resolution, filter, ratio, autorange, etc., flags and the computation mode (reading, A-B, ÷C, etc.). The pipeline comprises three levels. The top, level 1, reflects the state being programmed, the second, level 2, the state of the measurement circuits and the third, level 3, the measurement being processed. When a command is input, level 1 is updated (e.g. a new range is selected) and as soon as the measuring circuits are not converting an input signal, the state in level 1 is moved to level 2 causing the measurement circuits to update to the new state. When an A-D conversion is complete, data is read from the A-D and the state transferred from level 2 to 3, providing information for the processing routines. Additionally, at this time, the level 1 to level 2 transfer is repeated and the measurement circuits again updated to allow for commands received while the conversion is in progress.

A second control mechanism used is to input all the commands via a 'first in/first out' buffer between the interrupt level routine receiving the command and the main program implementing it. Thus the processor under remote control is able to 'simultaneously' set up the requirements for the next reading, convert the current reading and process the last one.

3.7.1.2 The Two-Phase Clock

The 6800 requires a non-overlapping positive two-phase (Ø1, Ø2) clock and is derived from the crystal master clock (sheet 4) producing a 1.6MHz (50Hz supply) or 1.9MHz (60Hz supply) signal. M57 acts as a ÷2 thus antiphase 800kHz square-waves appear on pins 14 and 15. If data is not being transferred to the CMOS Bus, M57-11 is high, thus M56-8 follows M57-15. The non-overlapping of Ø1 and Ø2 is produced by the utilization of the inherent propagation delay (approx. 10nS) through each gate of M54 and M55. This is best seen by referring to Fig.3.35, the circuitry around the output stage increasing the voltage levels demanded by the processor (0V and +5V).

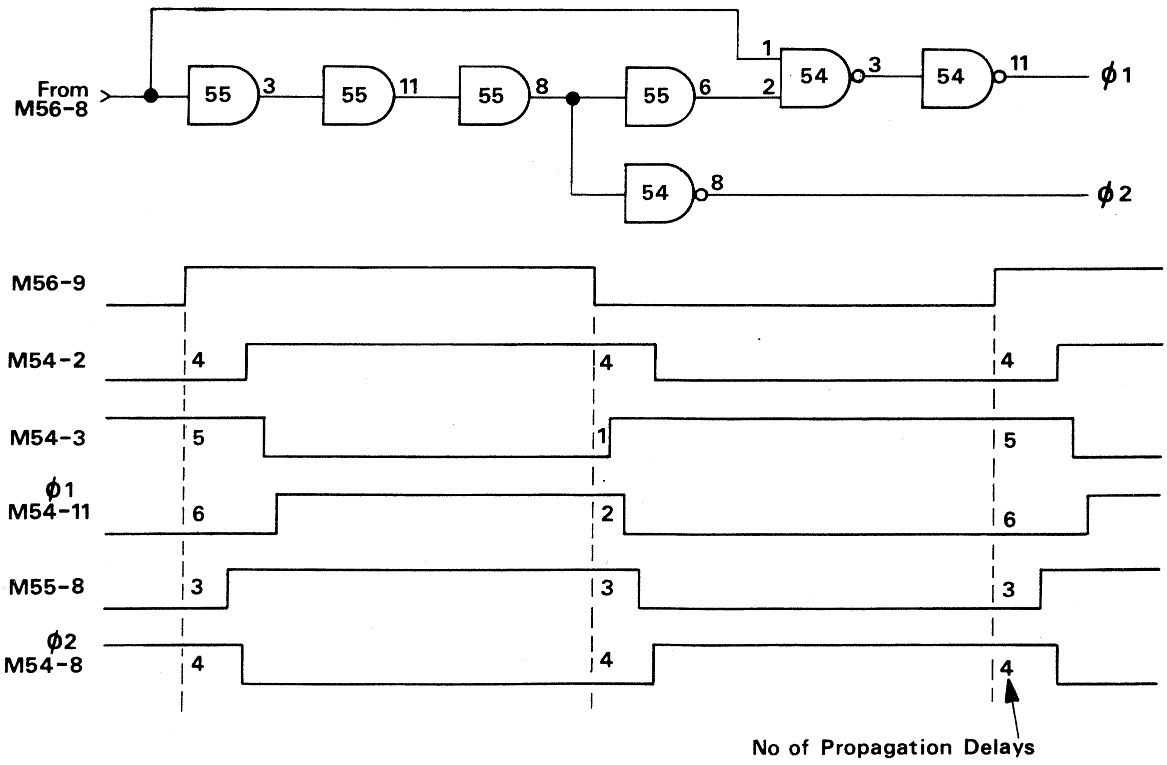


Fig. 3.35 TWO-PHASE CLOCK GENERATION

During a period when data is being transferred across the CMOS Data Bus, Ø1 and Ø2 are reduced to 400kHz by utilizing the other half of M57. The signal CMOS I/O is high thus a 400kHz square-wave is output on M57-11, the wave-forms of Ø1 and Ø2 are altered such that one half of the period is stretched, covering 1½ cycles of the normal 800kHz operation. (See Fig. 3.36).

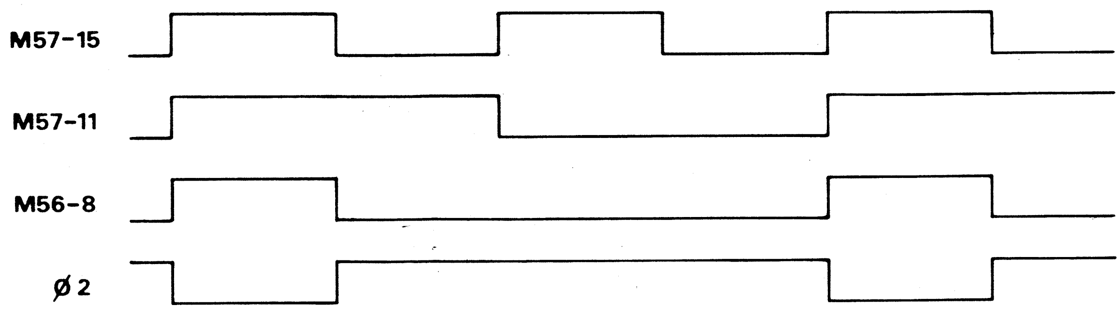


Fig. 3.36 TIMING DIAGRAM OF STRETCHED TWO-PHASE CLOCK

3.7.1.3 RAM/ROM Circuit

The 6800 uses 3 Read-Only Memory chips (ROMs) which contain the program necessary to run the instrument. Each ROM is able to store up to 4096, 8-bit 'bytes' of program information; grouped in program modules. The MPU accesses a byte by placing its address on the 16-bit Address Bus and driving the Valid Memory Address (VMA) line true (logic-1). The information held in that particular location is then sent back to the MPU via the Processor Data Bus.

The chip-select inputs for the RAM and ROM are decoded from a selection of high-order address bits. This selection determines the positions of the RAM and ROM in the memory map. For example: M30 is fed from A15.A13.A12 so that it covers the memory locations from #F000 to #FFFF (Note that since A14 is not decoded M30 also appears at #B000 to #BFFF).

The processor employs 1024 bytes of 8-bit wide Random Access Memory (RAM) made up from two 1024 x 4-bit RAMs (M31/M36). M31 and M36 are employed as operating memory for scratch pad operations and storing volatile data (e.g. Max, Min). The principal location of the RAM is from #0000 to#00FF. Since A8 and A9 are not decoded there are images starting at #0100, #0200, #0300.

A further 256 bytes of 8-bit wide RAM are made up from two 256 x 4-bit RAMs (M19/M20). M19 and M20 are backed up by a battery to provide the non-volatile 'Calibration' and 'Zero' memory. Three address bits A12, A14 and $\overline{\text{A15}}$ are decoded by M33 (pin 8) to enable M19/M20; but M29 (pin 6) permits the memory contents to be changed only if CAL is selected, or if the ZERO section of the memory is addressed (A7 and A6 both at logic-1).

The read/$\overline{\text{write}}$ control line R/$\overline{\text{W}}$ from the 6800 is gated with a 'Master Clock ÷ 2' signal to provide correct timing, and the address decodes include gating with VMAØ2.

An instrument power up is detected by M60/M62 causing an initialization $\overline{\text{RESET}}$ signal to be fed to the MPU via Q16. (See Fig. 3.38).

During a power-up or power-down (+5V supply line <+4.75V) a signal from the supply-level detectors prevents RAMs M19 and M20 from being overwritten by holding the CS (chip select) lines low (<0.2 volts) via Q14 for a period of approx. 25mS determined by R55/C32.

3.7.2 CMOS Address Decode and Input/Output Circuits (430526 sheet 2)

Information is transferred to and from CMOS devices via the CMOS Data Bus during periods when the signal CMOS I/O is at logic-1 (M33-6). CMOS I/O is addressed when $\overline{\text{A15}}$.A14.A11 is true. This occurs when memory locations starting at #4100 (and its images) are selected. The transfer of data between the Processor Data Bus and the CMOS Data Bus takes place at 400kHz, the Read/Write lines selecting the direction of the information through the tri-state buffers M4, M5 and M6.

In order to address the various CMOS input/output devices, the address lines must be further decoded. M32 is a 1-of-10 decoder, providing 5 addressable drives; M16 is a dual 1-of-4 decoder addressing the front panel circuitry and the digital elements of the A-D converter. A summary of the decoded CMOS address signals is given in Fig. 3.39.

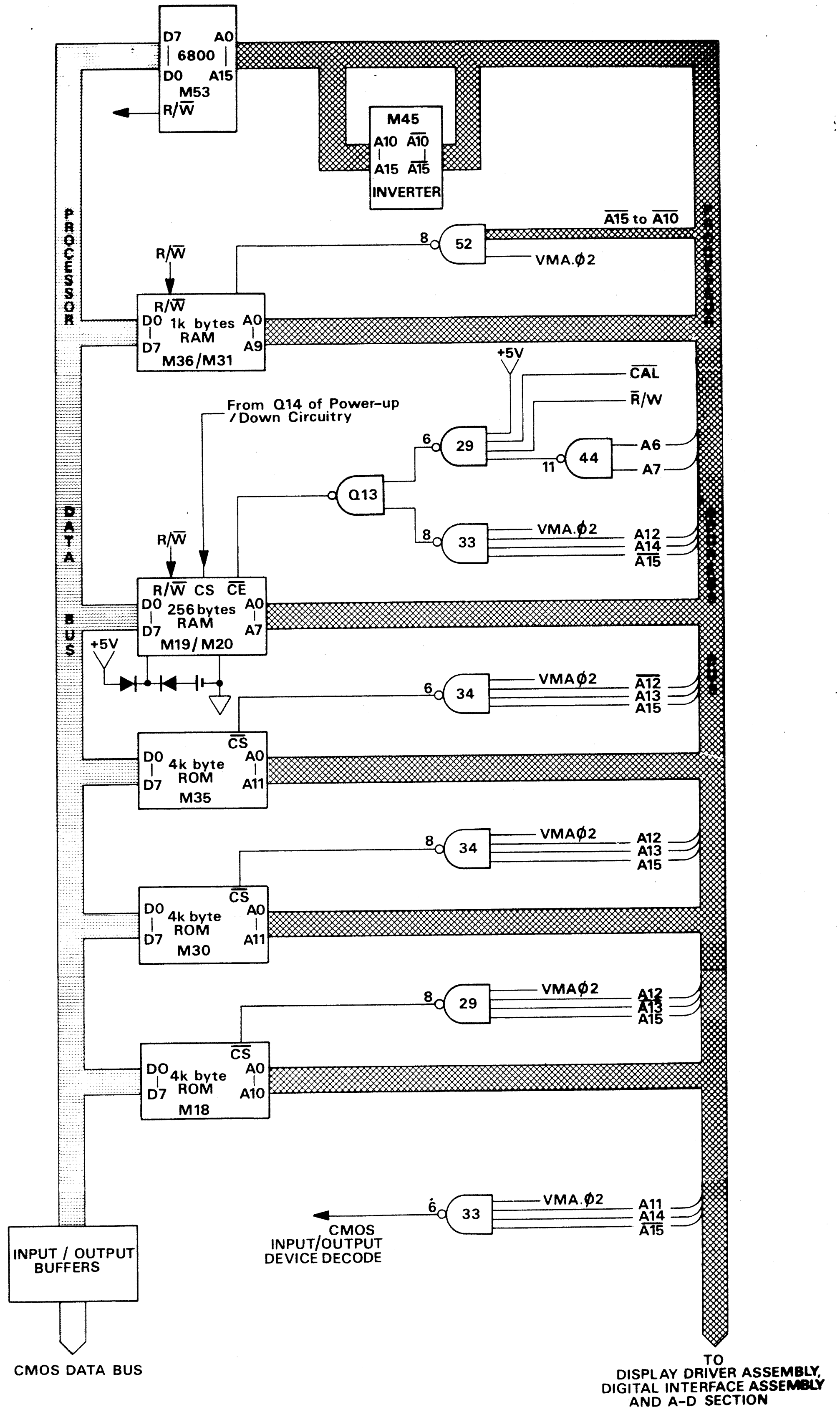

D7 A0
6800
D0 A15
M53
R/$\overline{W}$
M45
A10 $\overline{A10}$
A15 $\overline{A15}$
INVERTER
$\overline{A15}$ to $\overline{A10}$
PROCESSOR
8
52
VMA.Ø2
R/$\overline{W}$
R/$\overline{W}$
D0 1k bytes A0
RAM
D7 A9
M36/M31
+5V
$\overline{CAL}$
$\overline{R}$/W
From Q14 of Power-up /Down Circuitry
6
29
11
44
A6
A7
Q13
8
33
VMA.Ø2
A12
A14
$\overline{A15}$
R/$\overline{W}$
DATA
R/$\overline{W}$ CS $\overline{CE}$
D0 256 bytes A0
RAM
D7 A7
M19/M20
BUS
+5V
6
34
VMAØ2
$\overline{A12}$
A13
A15
$\overline{CS}$
D0 4k byte A0
ROM
D7 A11
M35
8
34
VMAØ2
A12
A13
A15
$\overline{CS}$
D0 4k byte A0
ROM
D7 A11
M30
8
29
VMAØ2
A12
$\overline{A13}$
A15
$\overline{CS}$
D0 4k byte A0
ROM
D7 A10
M18
6
33
VMA.Ø2
A11
A14
$\overline{A15}$
CMOS INPUT/OUTPUT DEVICE DECODE
INPUT / OUTPUT BUFFERS
CMOS DATA BUS
TO DISPLAY DRIVER ASSEMBLY, DIGITAL INTERFACE ASSEMBLY AND A-D SECTION

Fig. 3.37 **SIMPLIFIED DIAGRAM OF MEMORY CIRCUITS**

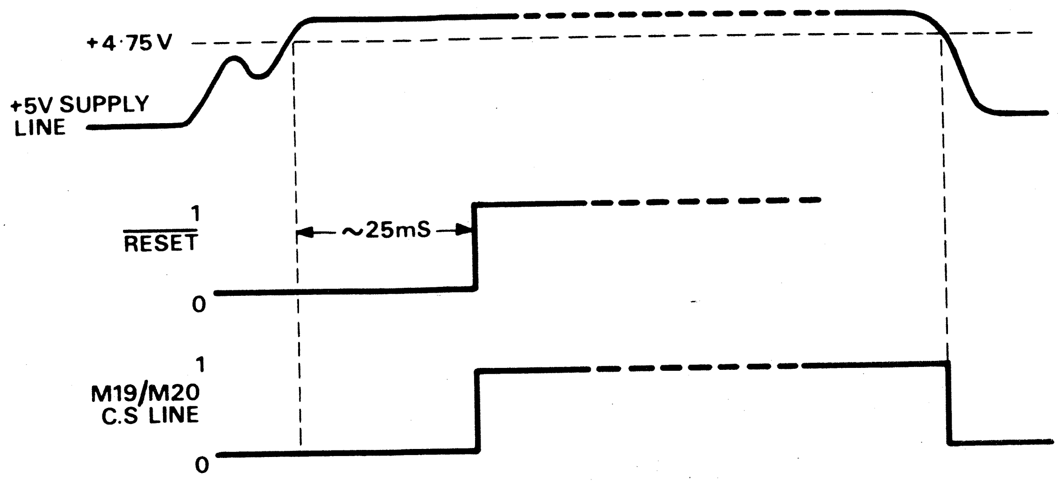


Fig. 3.38 START UP AND NON-VOLATILE RAM PROTECTION

A6	A5	A4	A2	A1	A0	SIGNAL	M32/M16 Pin No.	Operation
0	0	0	1	X	X	$\overline{\text{XKYBRD}}$	M32-2	Keyboard read/write
0	0	1	X	X	X		(M32-4)	Forces a MPU 'power up' sequence
1	0	0	X	X	X		(M32-11)	Triggers processor time guard (M43)
0	1	0	1	X	X	$\overline{\text{XADDT}}$	M32-6	A-D main counter output enable
0	1	1	X	X	X		(M32-9)	Analog interface address latch input enable
0	0	0	X	0	0	$\overline{\text{XKDSP0}}$	M16-7	Addresses keyboard l.e.d. latches
0	0	0	X	0	1	$\overline{\text{XKDSP1}}$	M16-6	
0	0	0	X	1	0	$\overline{\text{XKDSP2}}$	M16-5	
0	0	0	X	1	1	$\overline{\text{XKDSP3}}$	M16-4	
0	1	0	X	0	0	XADSTA	M16-9	A-D, and interrupt status output enable
0	1	0	X	0	1		M16-10	Error switch output enable
0	1	0	X	1	0	$\overline{\text{XADCTL}}$	M16-11	A-D control latches, input enable
0	1	0	X	1	1	$\overline{\text{XADDLY}}$	M16-12	A-D delay counter input enable

FIG. 3.39 CMOS ADDRESS DECODING

3.7.3 Analog to Digital Conversion (Digital Section)

3.7.3.1 General Principle

Block diagram Fig. 3.40 outlines the essentials of the digital section and should be used with flowchart Fig. 3.41 in order to follow the operation of this section.

The function of this section of the circuitry is to generate the sequence that when transferred to the analog section, controls the sequence from RESET through the integration cycle and back to RESET. The circuitry controls the length of SIG and BIAS and counts during REF 1 and REF 2, the accumulated count being proportional to the length of the reference periods, which in turn is proportional to the measured input signal. At the end of each reading cycle the count is read by the MPU, processed and displayed.

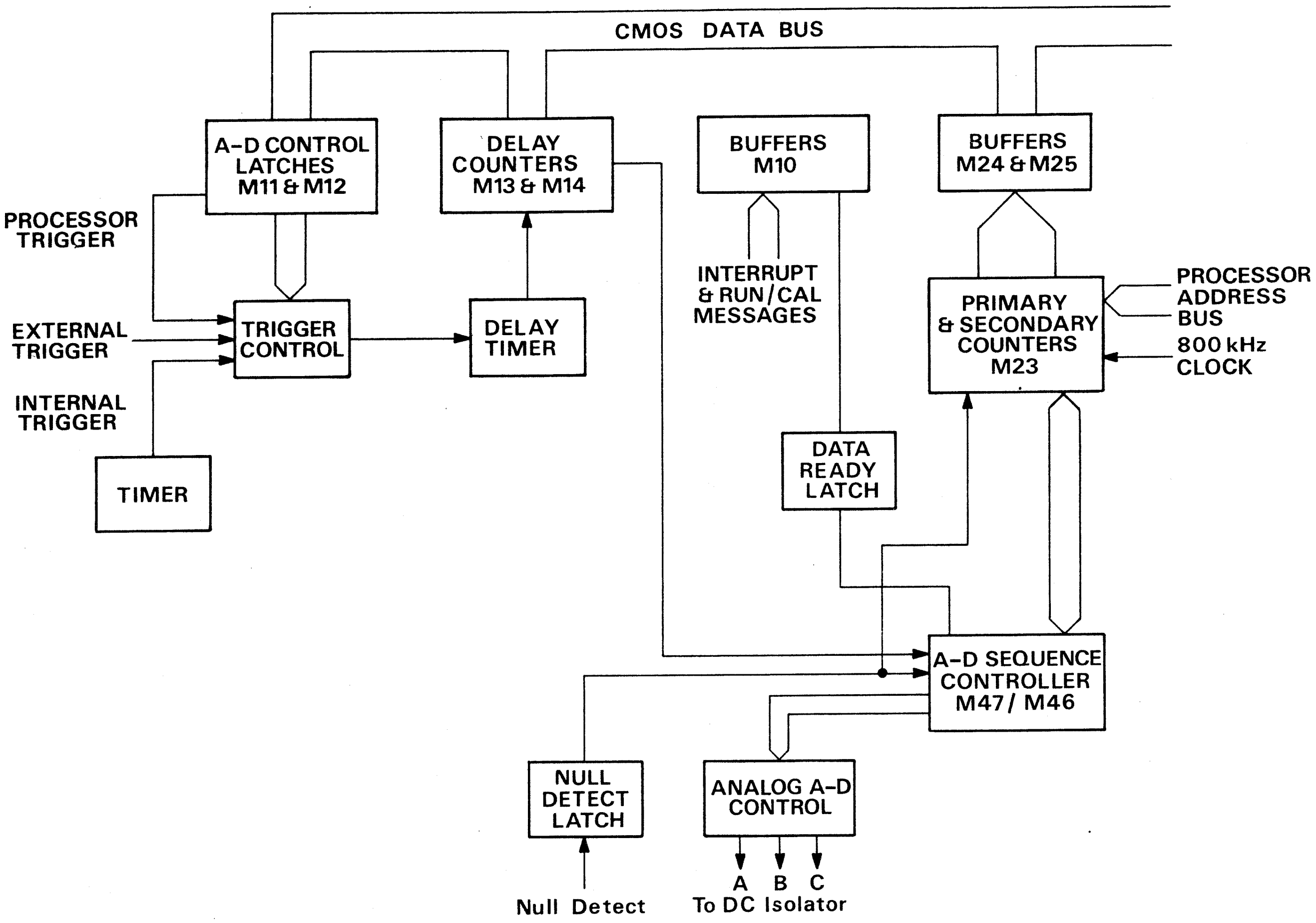

CMOS DATA BUS
A-D CONTROL LATCHES M11 & M12
DELAY COUNTERS M13 & M14
BUFFERS M10
BUFFERS M24 & M25
PROCESSOR TRIGGER
EXTERNAL TRIGGER
INTERNAL TRIGGER
TRIGGER CONTROL
DELAY TIMER
TIMER
INTERRUPT & RUN/CAL MESSAGES
PRIMARY & SECONDARY COUNTERS M23
PROCESSOR ADDRESS BUS
800 kHz CLOCK
DATA READY LATCH
A-D SEQUENCE CONTROLLER M47/ M46
NULL DETECT LATCH
ANALOG A-D CONTROL
Null Detect
A B C
To DC Isolator

Fig. 3.40 **SIMPLIFIED DIAGRAM OF DIGITAL SECTION OF A - D CONVERTER**

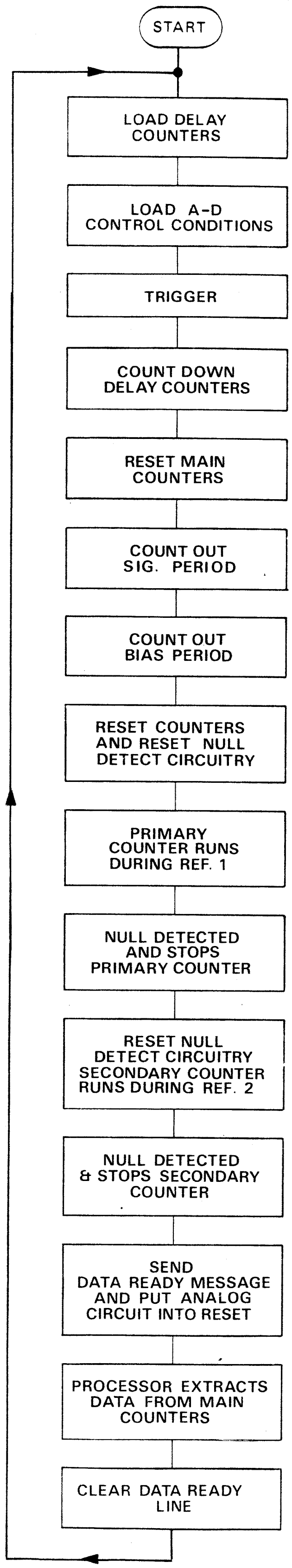

START
LOAD DELAY COUNTERS
LOAD A-D CONTROL CONDITIONS
TRIGGER
COUNT DOWN DELAY COUNTERS
RESET MAIN COUNTERS
COUNT OUT SIG. PERIOD
COUNT OUT BIAS PERIOD
RESET COUNTERS AND RESET NULL DETECT CIRCUITRY
PRIMARY COUNTER RUNS DURING REF. 1
NULL DETECTED AND STOPS PRIMARY COUNTER
RESET NULL DETECT CIRCUITRY SECONDARY COUNTER RUNS DURING REF. 2
NULL DETECTED & STOPS SECONDARY COUNTER
SEND DATA READY MESSAGE AND PUT ANALOG CIRCUIT INTO RESET
PROCESSOR EXTRACTS DATA FROM MAIN COUNTERS
CLEAR DATA READY LINE

Fig. 3.41 FLOWCHART OF A – D DIGITAL SECTION

SIGNAL	$\overline{A}$	$\overline{B}$	C
RESET	1	1	0
SYNCH	1	1	0
SIG	1	1	1
BIAS	0	1	1
WAIT	0	1	1
REF 1	1	0	1
REF 2	0	0	1
END	1	1	1

FIG. 3.42 A-D ANALOG SEQUENCE CONTROL SIGNALS

3.7.3.2 Preset Procedure

As part of the initialization routine (at switch on), M47 (used as the sequence controller), is reset from M37-11, causing M47-2 to be logic '1'. Thus the control lines $\overline{A}$, $\overline{B}$ and C put the analog section of the A-D into RESET (See Fig. 3.42). The Address Bus decoded signal $\overline{\text{XADDLY}}$ is taken low, enabling the presetting of the delay counters M13 and M14 from the CMOS Data Bus, the amount of delay being determined by the selected range, function and filter state, see Fig. 3.43. The A-D control latches, M11 and M12 are then enabled by $\overline{\text{XADCTL}}$ to (i) reset the command latch M1 (from M11-4), (ii) set the resolution of the main counter (M11-5 and 6), (iii) select trigger gate (M12-3, 4 or 5) and (iv) reset the data ready latch (M12-6).

FUNCTION	1081 COUNT $\overline{\text{FILTER}}$	 FILTER
DC Volts	6	101
AC Volts	101	22 } See NOTE
DC + AC Volts	101	22 } See NOTE
PRT	6	101
10Ω - 100kΩ	6	101
1MΩ	6	121
10MΩ	32	251

NOTE: With AC LF Filter in, a number (n) of delayed measurements follow EXT TRIG. The nth measurement is accepted as a valid reading for display.
Value of n:

FILTER selection	10Hz	1Hz	0.1Hz
Measurements/Reading	8	50	550

FIG. 3.43 COMMAND DELAYS

3.7.3.3 A-D Measurement Sequence

Trigger. The trigger, required to initiate the measurement sequence, is generated from one of three possible souces:

1. Internally generated 2/second trigger, from timer M61-7.
2. Externally generated trigger, from EXT TRIG on rear panel via M24-13.
3. An MPU-derived trigger from M11-3 generated when auto-ranging, during calibration or a ZERO sequence, or via the digital interface.

The trigger source is selected by the latched data on M12, enabling one of the three gates of M2.

Delay. The trigger pulse clocks the 'command latch' M1 causing the timer, M15, to output clock pulses (100Hz) to the delay counters (M13 and M14) after a delay of approx. 1.5mS set by C5, R8, R9, R11. The delay counters proceed to count down to zero, at which time the delay latch (M26) is clocked. Thus M26-14 becomes a logic-0, enabling the sequencer M47 (an octal counter) to proceed on to the next step via M46-2.

SYNCH. The SYNCH phase from the sequencer resets the counters of M23 and places the analog section of the A-D into SIG. The pulse is fed back to M47 via M46-3 to step on the sequencer.

SIG. During the time the SIG line is at logic-1 (M47-3), the primary counter in M23 is enabled and counts out the signal period (160ms). At the end of this period M23-23 goes to logic-0, enabling M47-13 via M46-11, and stepping the sequence on to BIAS (FFWD/M47-7 to logic-1).

BIAS. The BIAS signal (M47-7) is transferred to the analog section of the A-D by changing the state of the $\overline{A}$ line (M38-9 to a logic '0'). BIAS also enables the secondary counter of M23 to count out the BIAS period (160μs). The signal indicating the end of this period is passed via M46-9 causing the sequencer to carry on to the next step. The BIAS signal also resets the 'delay latch' (M26) ready for the next measurement cycle, and the 'null detector' latch (M22A).

WAIT. The WAIT pulse resets the counter of M23 via M39-10, keeps the $\overline{A}$ line to the analog section low, clocks the polarity null detect latch M22(B) causing a logic '1' on pin 1 if the signal applied to the analog section of the A-D converter was positive (logic '0' if negative) and is fed back to enable the sequencer via M46-3.

REF 1. The high to low edge of WAIT causes the $\overline{A}$ to change state and going into REF 1 makes $\overline{B}$ a logic '0'. The analog side is then in the condition to start 'ramping down'. While REF 1 is high the primary counter of M23 is enabled (pin 3) and counts the period of REF 1.

REF 1 is ended when a null detector pulse is detected and latched on to M22. This causes the sequencer to step on once more from M46-3, the low to high edge from pin 4 disabling the primary counter.

REF 2. The REF 2 signal changes the state of the $\overline{A}$ line (causing the analog section to ramp down at a slower rate), resets the 'null detect' latch and enables the secondary counter of M23 (Pin 13) to count the period of REF 2. If the secondary counter overflows the primary counter is incremented from M23-16.

As in REF 1, a null detector pulse causes the counting period to end (M22-12) and increment the sequencer via M46-3 causing the $\overline{A}$ and $\overline{B}$ lines to change state.

END. The low to high edge from M47-10 is fed back to M47, via M48-6 giving a master reset. Thus the sequencer is placed into RESET.

RESET. The sequence pulse from M47-2 clocks the 'data ready' latch M1-3 placing a signal on to the CMOS Data Bus via tri-state buffer M10 indicating to the MPU that a reading is ready to be taken from the main counter M23. Data is extracted from the counters in three bytes (controlled by the A1 and A0 lines of the processor address bus) with the counter output buffers, M24 and M25 being enabled by $\overline{\text{XADDT}}$, a decoded processor address.

The RESET signal is also passed to the analog section of the A-D by changing the state of the C line.

Once the data has been extracted from the main counter the set-up procedure is then repeated to await a further trigger.

3.7.3.4 Master Clock (430526 sheet 4)

The master timing element of the instrument is a crystal controlled Colpitts oscillator. The crystal is chosen to be a binary multiple of the supply frequency to provide an oscillator output of 1.6384MHz (50 or 400Hz supply) or 1.96608MHz (60Hz supply).

3.8 FRONT PCB ASSEMBLY (Circuit Drawing No. 430294)

The Front pcb assembly accepts the input signals, digitally displays the value, provides manual control of the measurement circuits and data conditioning; and gives a visual status indication of the selectable Instrument states.

3.8.1 Analog Input Signals (430294 sheet 2)

Signals applied to the front panel input terminals are routed directly to the rear panel pcb along two cables. The first takes the Hi and I+ lines and the second takes the lines: Lo, I− and Ω's Guard. Both cables are screened by front panel Guard.

KEY	M7			
	14	15	16	17
	CD7	CD6	CD5	CD4
100	0	0	0	0
10	0	0	0	1
1000	0	0	1	0
10MΩ	0	0	1	1
1	0	1	0	0
.1	0	1	0	1
10Ω	0	1	1	0
AUTO	0	1	1	1
DC	1	0	0	0
kΩ	1	0	0	1
KEYBOARD	1	1	0	1
PRT	1	1	1	0
ZERO	1	1	1	1

KEY	M10			
	14	15	16	17
	CD3	CD2	CD1	CD0
SIG	0	0	0	0
REF	0	0	0	1
△	0	0	1	0
RATIO %	0	0	1	1
(A-B)	0	1	0	0
HI RES	0	1	0	1
÷ C	0	1	1	0
MAX	0	1	1	1
MIN	1	0	0	0
RESET	1	0	0	1
HOLD	1	0	1	0
FILTER	1	1	0	1
AC	1	1	1	1

FIG. 3.44 CMOS DATA BUS : KEY SELECT CODING

The front panel pcb connects the front panel input terminals to the 2-4 wire and Local-Remote switches. Thus I+ and I− are wired to the 2-4 wire switch through thermistors R1 and R2 for connection to Hi and Lo if required. Similarly, Ω's Guard and Guard may be shorted via the Local-Remote switch.

3.8.2 Display Signals (430294 sheet 1)

The front panel pcb routes the display signals from the Display Driver assembly to the plasma display.

3.8.3 Keyboard Data Encode (430294 sheet 1)

Selection of a front panel keyswitch causes one of the two 16-key encoders (M7 or M10) to send a data available message to M2 (a data latch) and to remember which key was pressed. The output of M2, (pin 1 or 13) signals the interrupt circuitry of the Digital Board (IRQK1 or IRQK2).

When the microprocessor accepts the interrupt and has located the source, the XKY BRD line to pin 13 of M7 and M10 is taken low, enabling the data outputs of the encoders to be placed on to the CMOS data bus (See Fig. 3.44 for the key select coding). This signal also resets M2 ready for the next key selection.

CMOS DATA LINE	M12/M11	M8/M5	M6/M4	M9
CD0	÷ C	DC	AUTO	
CD1	HI RES	kΩ	10Ω	
CD2	RATIO %	ZERO	.1	
CD3	△	FILTER	1	
CD4	A-B	KEYBOARD	10	
CD5	MIN		100	HOLD
CD6	MAX	PRT	1000	REF
CD7	RESET	AC	10MΩ	SIG

FIG. 3.45 CMOS DATA BUS : LED-SELECT CODING

3.8.4 Keyboard LED Data Decode (430294 sheet 1)

The $\overline{\text{XKYBRD}}$ signal is inverted by R6, R7 and Q1 to enable the LED data latches. These are divided into the four sets: M4/M6, M5/M8, M11/M12, M9; each set being addressed by one of the $\overline{\text{XKDSP}}$ lines.

On initialization or after a change of the instrument's selectable states, the LED data latches are updated by placing data on the CMOS Data Bus (see Fig. 3.45) while addressing the appropriate set of data latches (eg. XKDSP1 addresses M5/M8); then clocking from the CMOS CLK line (J2-6).

The outputs of the LED latches provide the signals to the bases of the LED drive transistors, switching them on or off as required.

3.9 DISPLAY DRIVER ASSEMBLY (Circuit Diagram No. 430301)

Basically, the Display Driver assembly receives the display information from the microprocessor (running at 800kHz) and stores it in a Random Access Memory (RAM) digit by digit. This data is then read out at a slower frequency (2kHz), level shifted and output to the gas discharge display.

NOTE: In the following description, each bar, decimal point or legend is referred to as a display segment and each set of segments i.e. ±,8 or a legend block, is referred to as a display block.

3.9.1 Write Mode

On completion of a reading or when certain modes are selected, (e.g. SPEC, keyboard entry), the processor indicates to the Display Driver Board that data is ready to be transferred by the signal XDDSP (TP6). This causes the RAM (M1) to be placed into its write mode and the quadruple 1-to-2 data selector, M9, to select the 'B' inputs which are connected to the processor Address Bus.

The signal XDDSP also causes the tri-state buffers M6 and M7 to become enabled, causing the data input lines of the RAM to be connected to the processor data bus. Thus under MPU control, the display data (±1,8's, decimal points, legends and commas) are written into the RAM.

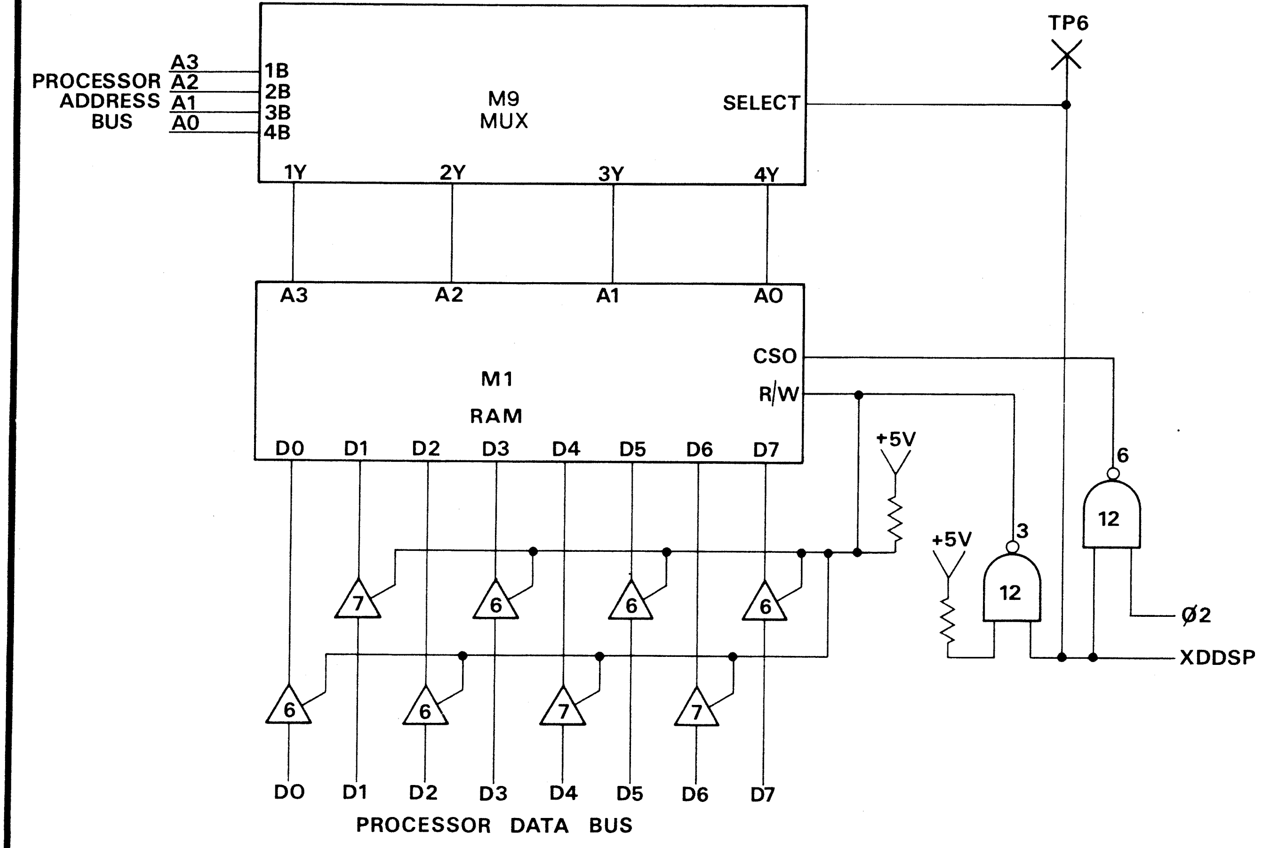


Fig. 3.46 DISPLAY DRIVER WRITE CIRCUITRY

COUNTER (M8)				RAM (M1)				COMMA MULTIPLEXER (M10)				Display block energized or operation implemented from M11
Q_3	Q_2	Q_1	Q_0	A_3	A_2	A_1	A_0	INHIBIT	C	B	A	
0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	1	0	0	1	0	0	0	1	0	3
0	0	1	0	0	1	0	0	0	1	0	0	5
0	0	1	1	0	1	1	0	0	1	1	0	7
0	1	0	0	1	0	0	0	1	0	0	0	9
0	1	0	1	1	0	1	0	1	0	1	0	11
0	1	1	0	1	1	0	0	1	1	0	0	Load comma data
0	1	1	1	1	1	1	0	1	1	0	0	
1	0	0	0	0	0	0	1	0	0	0	1	2
1	0	0	1	0	0	1	1	0	0	1	1	4
1	0	1	0	0	1	0	1	0	1	0	1	6
1	0	1	1	0	1	1	1	0	1	1	1	8
1	1	0	0	1	0	0	1	1	0	0	1	10
1	1	0	1	1	0	1	1	1	0	1	1	Reset Counter

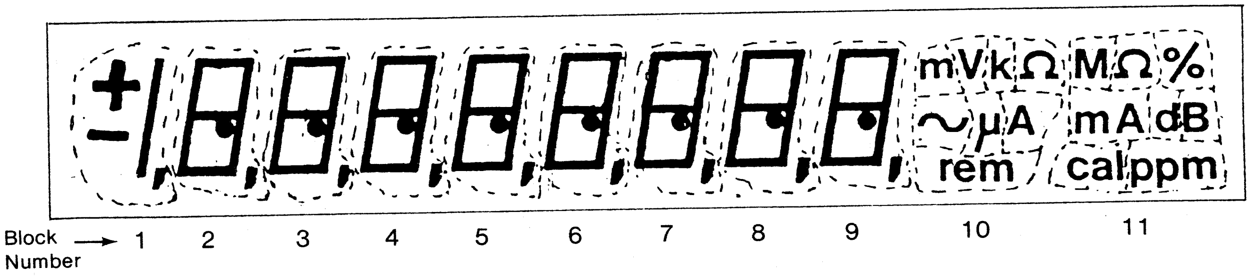


FIG. 3.47 DISPLAY DRIVER READ MODE ADDRESS STATES

PNS 5 16 9

Once this transfer of data is complete, signal XDDSP reverts to logic-0 selecting the read mode of the RAM. The buffers return to their open-circuit state, isolating the RAM Data Bus from the main Processor Data Bus.

3.9.2 Read Mode

A multiplexed display is normally scanned from left to right, driving each anode in turn and providing the appropriate segment information to the cathodes. For this type of display, however, adjacent anodes should not be activated consecutively, as this can cause inter-block ‘streaming’. Thus the 1081 employs two scans per cycle: the first for odd numbered blocks, the second for even.

The free running clock M13, R3, R5, C16, produces a 2kHz signal (M13-9) to drive a 4-bit binary counter, M8, which provides the control of the address lines in the read mode (See Fig. 3.48). The display block selection is achieved by decoding these 4 lines into 16 bits using M11. The output lines of M11 are connected to the bases of transistors Q1-Q3, Q13-Q20 which act as anode switches. Note that when the address lines are in the state 0000 the output of M11 (pin 11) selects the anode to block 1; 0001 selects the anode to block 3 (M11-9); 0010 ... block 5, etc., thus the display blocks are selected alternately.

To select the appropriate segment data from the RAM to match the display block selection the address lines are given a left hand bit rotation i.e. if the output of M8 is labelled DCBA, (2^3, 2^2, 2^1, 2^0), the address input of M1 would be CBAD. (Fig. 3.47 gives the state of the address lines for each display block). The particular display block segment data is recalled by the RAM, buffered by M4 and M5, level shifted −180 volts by R8-R15, C4-C11 causing Q5-Q12 to drive the cathodes, D4-D11 acting as restoration diodes. Between the transfer of each set of segment data, M13-3 is taken high, causing the outputs of M4 and M5 to be a logic ‘0’. This produces a refresh period for capacitors C4-C11 to discharge from the −180V supply through the restoration diodes. Each ‘8’ display block consists of 7 ‘digit bars’, a decimal point and a comma, thus a total of 9 bits is needed to drive the block. As the 6800 series only has an 8 bit wide data bus, the comma information is treated as extra word. When the RAM is in its write mode, the last byte transferred from the processor is the comma information (8 bits for segments 1 to 8, See Fig 3.48).

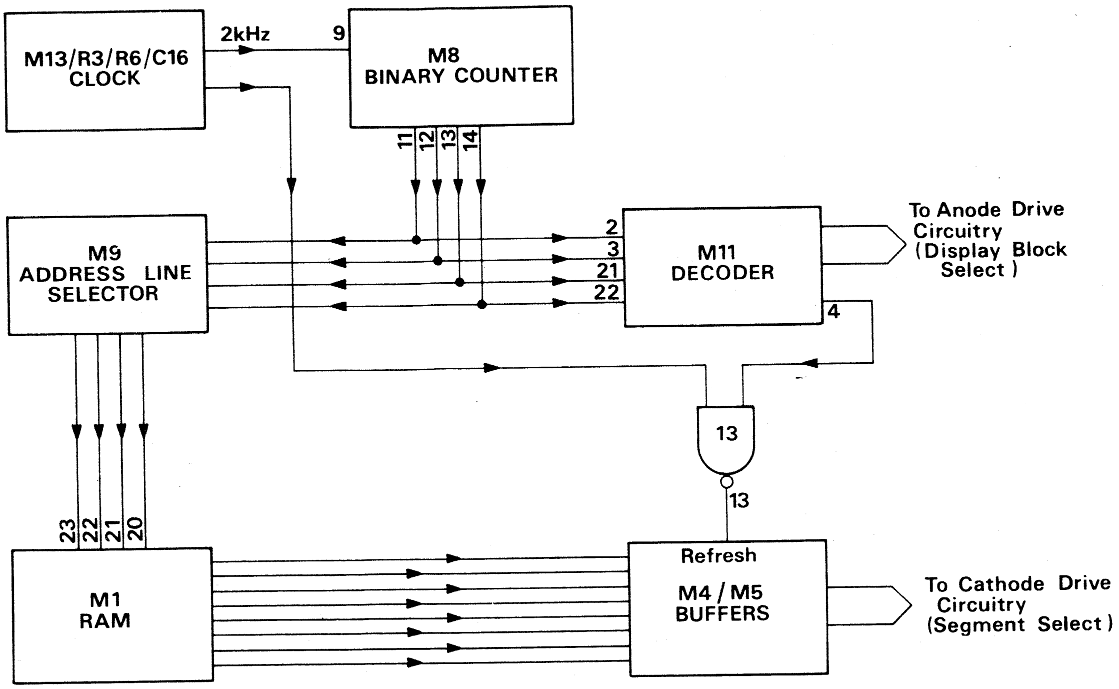

M13/R3/R6/C16
CLOCK
2kHz
9
M8
BINARY COUNTER
11
12
13
14
M9
ADDRESS LINE
SELECTOR
2
3
21
22
M11
DECODER
4
To Anode Drive
Circuitry
(Display Block
Select)
13
13
23
22
21
20
M1
RAM
Refresh
M4 / M5
BUFFERS
To Cathode Drive
Circuitry
(Segment Select)

Fig. 3.48 SIMPLIFIED DISPLAY DRIVER READ CIRCUITRY

In the read mode the comma information is transferred from the RAM to latches M2 and M3 (Fig. 3.49) when the RAM address is 1110. So that this information is not sent to the cathodes of the display (it would constitute a display segment combination under the normal cycle), it is inhibited from passing through M4 and M5 by the decoder (M11-4). The previous signal from M11 (pin 5) is delayed by R6, D2, C2 such that when it reaches pin 7 of M2 and M3 it is coincident with that from M11-4, clocking the comma data on to the latches. M2/M3 outputs are permanently enabled, so the comma data is transferred to the 'X' inputs of 8-channel selector M10. As M10 is under the control of block counter M8, it multiplexes the comma data to coincide with activation of the corresponding block anode. M10 'Z' output is passed via M13 and Q4 to the comma segment (i) line, subject to inter-block refresh by M13-13 as for M4/M5.

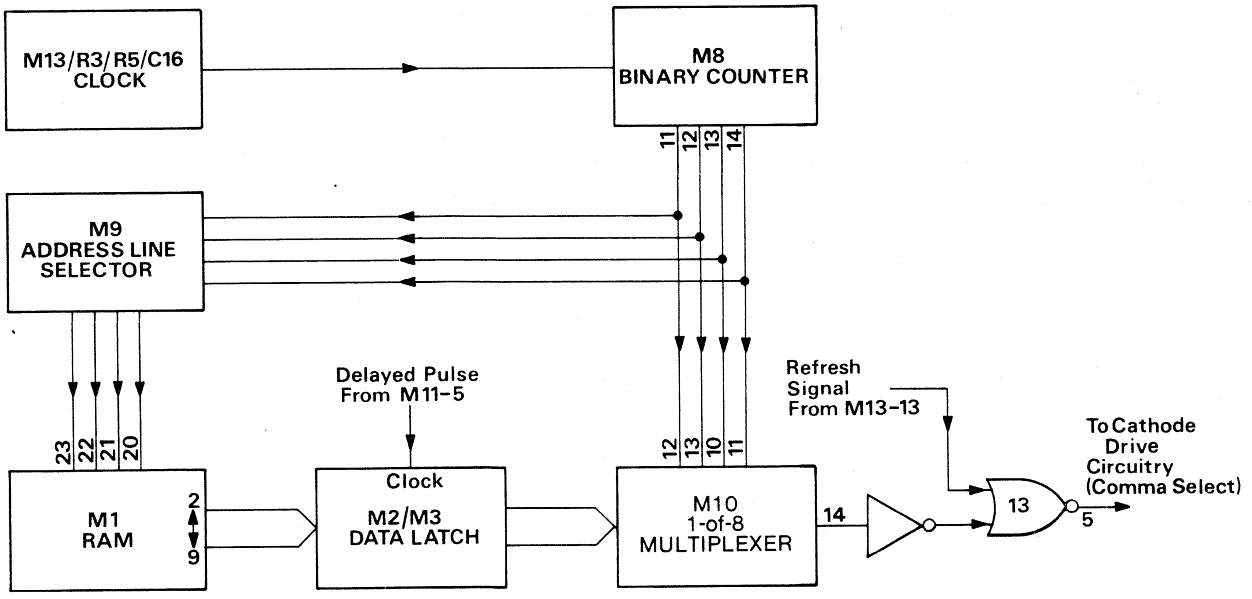

M13/R3/R5/C16
CLOCK
M8
BINARY COUNTER
11
12
13
14
M9
ADDRESS LINE
SELECTOR
Delayed Pulse
From M11-5
Refresh
Signal
From M13-13
23
22
21
20
12
13
10
11
M1
RAM
2
9
Clock
M2/M3
DATA LATCH
M10
1-of-8
MULTIPLEXER
14
13
5
To Cathode
Drive
Circuitry
(Comma Select)

Fig. 3.49 COMMA DISPLAY READ CIRCUITRY

3.10 IEEE 488 STANDARD DIGITAL INTERFACE (Circuit Diagram No. 430427)

The IEEE Digital Interface assembly contains the extra memory circuitry required for the execution and decoding o interface functions, and for data input and output transfers. Simplified diagram Fig. 3.50 shows its essential features.

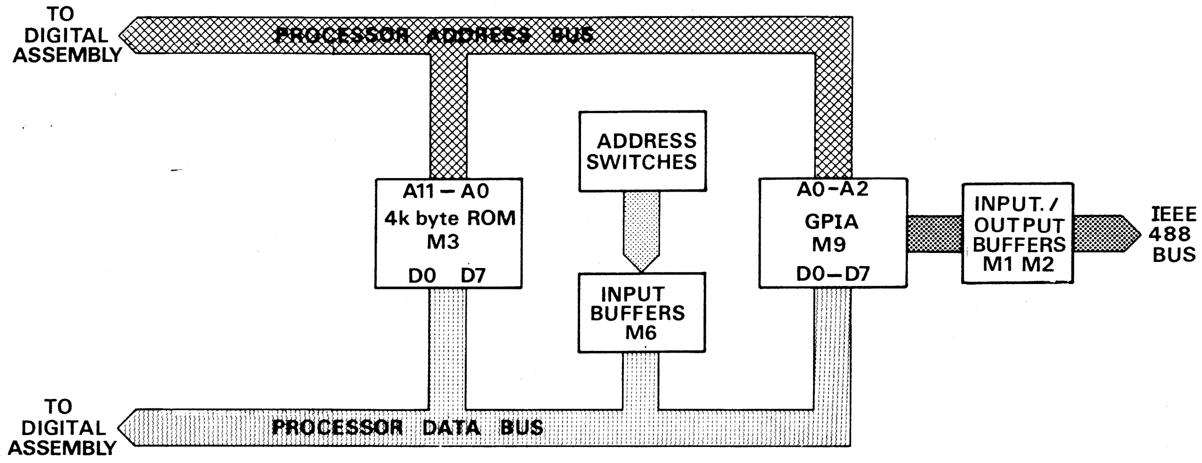


Fig. 3.50 SIMPLIFIED DIAGRAM OF IEEE ASSEMBLY

3.10.1 ROM Circuit

The IEEE Digital Interface assembly acts as an extension to the Digital assembly with connections to both the Processor Address and Data Buses. The board houses 4k bytes of program memory (M3) containing the sub-routines to control the instrument from the IEEE 488 Bus. The ROM receives the address information, with chip selection being made by decoding address lines A3-A11 with XIOBD and master clock $\phi 2$.

3.10.2 Interface Circuit

The General Purpose Interface Adaptor (GPIA). M9, provides the interface between the IEEE 488 Standard Instrument Bus and the 6800 microprocessor. The MPU can receive, process and send messages to the interface through the GPIA.

The GPIA is able to automatically handle the following interface protocol[1]:-

Single address capability
Source and acceptor handshake
Talker and Listener states
Service Request
Parallel Poll
Device Clear
Device Trigger

With the MPU it is also capable of:-
Programmable Interrupts
Storing the instrument's address
Control of the interface input/output buffers.

The GPIA is selected by decoding address lines A3-A11 with XIOBD. Address lines A0-A2 with the state of the MPU $R/\overline{W}$ line select one of the 8 read only or 7 write-only registers in the GPIA, enabling the MPU to send or receive data over the interface.

The two signals $T/\overline{R}1$ and $T/\overline{R}2$ are used to control low power transceivers (formed from M1, 2) which drive the interface bus.

---

[1] For further information refer to 'Getting aboard the 488 Bus' published by Motorola.

3.11 REAR (POWER SUPPLY) ASSEMBLY (Circuit Diagram No. 430295)

3.11.1 General

The line transformer and power supply components are situated at the rear right hand side of the instrument, when viewed from the front. Transformers T1 and T2 are of toroidal construction mounted one on top of the other and bolted to the rear panel. T1 has a split primary comprising two 115V windings, intended for either series or parallel connection depending on the line voltage. An earth screen is interposed between primary and secondary windings to minimise electrostatic coupling, and is grounded to line ground. The second transformer T2 is driven from T1. It also possesses an electrostatic screen, this time being connected to Guard.

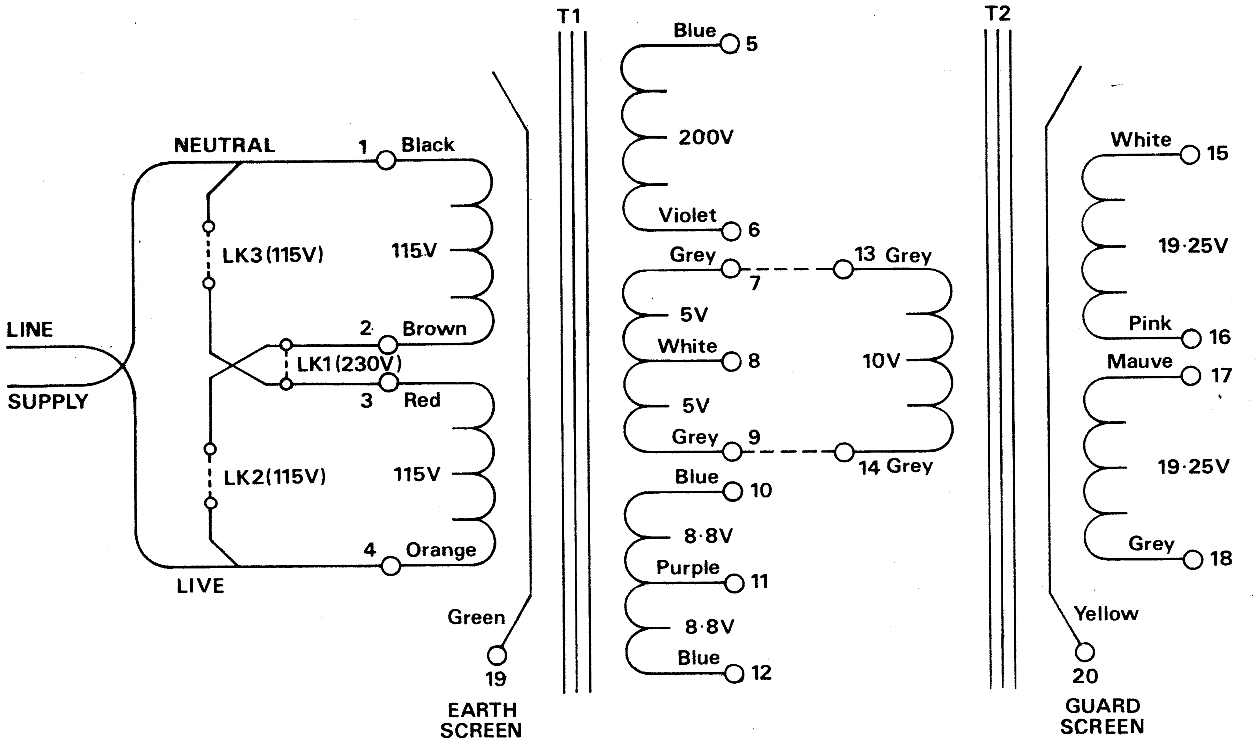


Fig. 3.51 LINE TRANSFORMER

3.11.2 180V supply

The 180V supply is required for the plasma display. The 200V AC output from the secondary of T1 is full-wave rectified by W1 and smoothed by C6. R6/D3 form a 6.8V reference so that Q2/R4 becomes a constant current sink of approx. 14mA. Shunt regulator D4/Q1 maintains 180V between J1-5 and J1-2. J1-5 is referenced by direct connection to the digital +5V line in the Display driver assembly.

3.11.3 5V supply

All the logic circuitry to the right of the instrument's central pcb is powered from the supply generated by the two 8.8V, 750mA secondary windings on transformer T1. The center-tap (digital common) is connected to line ground. D1 and D2 form a bi-phase bridge applying a full-wave rectified supply to reservoir capacitor C7. The 5V regulator is referred to R2 rather than ground so that the 5V rail can be accurately set. Feedforward capacitor C8 improves the effective ripple rejection of M1.

3.11.4 ±15V Supply

The output of the third secondary winding of transformer T1 (10V AC) is input to the primary of T2. The two 19.25V outputs are connected in series, with the centre tap connected to analog common. The output of bridge rectifier W2 is fed to voltage regulators M2 and M3, to produce positive and negative 15 volt supplies to power the analog circuitry. These regulators also include foldback current limiting and thermal shut-down, to provide short-circuit protection.

3.12 SELF TEST SEQUENCE

Selection of the → key then the TEST key places the instrument into a test routine, checking the display and basic measurement circuits. A flowchart for the routine is given in Fig. 3.52. The analog circuitry conditions for each test are given in the last subsection of the circuit description for the particular assembly. The Range FET patterns are listed in Appendix 1.

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D1	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	10
D2	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D3	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D4	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D5	200008	200mA 125v LL Si DIODE	FAIRCHILD	IN458A	1
D6	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	1
D7		NOT USED			–
D8		NOT USED			–
D9		NOT USED			–
D10	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D11	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D12	200002	1A. 50v. GP. Si. DIODE	FAIRCHILD	IN4001	2
D13	213006	5V 5W ZENER	UNITRODE	TVS 505	1
D14	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D15	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D16	200002	1A. 50v. GP. Si. DIODE	FAIRCHILD	IN4001	–
D17	200001	Si GP. DIODE	FAIRCHILD	IN4148	–
D18		NOT USED			–
D19		NOT USED			–
D20		NOT USED			–
D21	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–

NOTES.

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DATE 13. 12. 82	datron ELECTRONICS LTD	
DRAWN JL	TITLE 1081 DIGITAL PCB. ASSY.	
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APPROVED		
DATE	DRAWING NUMBER 400526	SHEET 10 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q1	240001	Si NPN TRANSISTOR	NATIONAL	BC184	3
Q2	240001	" " "	"	"	–
Q3	240007	" " "	"	2N3646	2
Q4		NOT USED			–
Q5	240006	Si NPN TRANSISTOR	NATIONAL	2N3904	3
Q6	250004	Si PNP "	"	2N3906	3
Q7	250004	" " "	"	"	–
Q8		NOT USED			–
Q9		NOT USED			–
Q10		NOT USED			–
Q11	240006	Si NPN TRANSISTOR	NATIONAL	2N3904	–
Q12	250011	" PNP "	"	BC327	1
Q13	240007	" NPN "	"	2N3646	–
Q14	240001	" " "	"	BC184	–
Q15	240006	" " "	"	2N3904	–
Q16	250004	" PNP "	"	2N3906	–

NOTES.

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SECTION 4

INTERNAL ADJUSTMENT PROCEDURES

4.1 CHANGING LINE VOLTAGE AND LINE FREQUENCY

The instrument is set to 50Hz, 205V to 255V supplies unless Option 80, 81 or 82 is specified. This information is carried on the instrument identification label located on the rear panel. Alteration to a different line voltage/line frequency may necessitate an instrument recalibration.

4.1.1 Changing Line Voltage

1. Disconnect power and all signal input/output leads.
2. Remove the lower cover.
3. Locate the link(s) connecting the split primary on the printed circuit board in front of the toroidal mains transformer, Fig. 2.1 and Drawing No 400295.
4. 115V Operation:- Remove LK1 (link 1) and fit LK2 and LK3[1].
   230V Operation:- Remove links LK2 and LK3, and fit LK1[1].
5. Amend instrument identification label.
6. Replace lower cover.
7. Replace power fuses with 160mA anti-surge (230V) or 500mA anti-surge (115V).
8. Carry out the Specification Verification tests (Section 8, User's Handbook) and recalibrate if necessary.

4.1.2 Changing Line Frequency

1. Disconnect power and all signal input/output leads.
2. Remove the top cover.
3. Change X1, C23, C24 on the Digital assembly (Drawing No. 400526) to the values shown below.

50/400Hz	Datron Part Number	Description
X1	800020	1.6384MHz crystal
C23	130059	470pF 500V Ceramic Disc
C24	130015	120pF 160V Polystyrene

60Hz	Datron Part Number	Description
X1	800021	1.96608MHz crystal
C23	102331	330pF 500V Ceramic Disc
C24	130006	82pF 160V Polystyrene

4. Amend Instrument identification label.
5. Replace top cover.
6. Carry out the Specification Verification tests (Section 8, User's Handbook) and recalibrate if necessary.

4.2 BATTERY REPLACEMENT

The battery should be replaced on or before the date indicated on the rear panel instrument identification label. To retain the calibration memory; the instrument must be powered-up during replacement. Therefore great care must be taken due to voltages up to 260 volts being present inside the instrument.

1. Remove top cover and locate battery on the Digital assembly (see Fig. 2.1).
2. Power-up instrument.
3. Desolder battery at end of tags and remove from clip.
4. Replace with new battery, (Datron Part No. 930049) positive terminal to resistor.
5. Replace top cover.
6. Amend instrument identification label (Current date +5 years).
7. Carry out the Specification Verification tests (Section 8, User's Handbook) and recalibrate if necessary.

4.3 POST-REPAIR PROCEDURES

Most integrated circuits and semiconductor devices used in the 1081 are manufacturers' standard products. Two exceptions, available only from Datron, are:

RMS Module (M11 on AC assembly)
Programmed ULA (M23 on Digital assembly)

During manufacture certain resistors are selected in value (FSV = Factory Selected Value) to accommodate circuit component tolerances, or to bring the desired setting of the preset control to the center of its adjustment range.

To achieve the high performance of the 1081, some critical devices have been selected for low leakage, high speed or low noise etc., and are marked with a paint spot. Therefore any replacements for these parts should be ordered from Datron stock.

NOTE:
A routine calibration as detailed in Section 1 should be carried out after completion of the following procedures.

WARNING:
Up to 260 volts is present inside the instrument. Personal contact with this voltage may result in injury.

---

[1] Links should be 22 SWG TIN.Cu wire with silicone rubber sleeving.

4.3.1 Basic DC Instrument

Equipment Requirements:

5½ digit Digital Voltmeter e.g. Datron 1065, 1061
Variable 5V, 1 amp DC supply
5mV/division Oscilloscope e.g. Telequipment D83
DC Voltage Calibrator, e.g. Datron 4000 or 4000A
Shielded 10MΩ resistor in parallel with 10nF capacitor, e.g. Datron part No. 400392.

Procedure:

Power Supplies

1. Turn instrument on and allow 30 minutes warm-up period.

2. Connect DVM Hi to TP8 and Lo to TP28 on the Digital Board. Adjust R2 on the Rear (Power Supply) pcb assembly to give +5.100V ±25mV.

3. Connect DVM Hi to TP1 and Lo to TP23 on the Analog assembly. Adjust R7 on the Rear (Power Supply) pcb assembly to give +15.000V ±15mV.

4. Connect DVM Hi to TP2 and Lo to TP23 on the Analog assembly. Adjust R12 on the Rear (Power Supply) pcb assembly to give −15.000V ±15mV.

Digital Assembly

5. Switch the instrument off and disconnect the power lead.

6. Isolate the Digital assembly by removing the connectors along the centre panel (J1-J5).

7. Connect variable 5V supply and DVM Hi's to TP8, Lo's to TP28. Reduce supply to 4.750 ±10mV.

8. Set R83 fully clockwise. Connect oscilloscope Lo to TP28 and monitor M53 pin 40. Turn R83 anti-clockwise until TP30 undergoes a high to low transition (or begins to pulse low).

9. Remove variable supply and reconnect items disconnected in steps 5 and 6. Disconnect the oscilloscope. Switch on the instrument.

10. Connect DVM Hi to battery positive terminal, Lo to TP28. Check battery voltage is >2.5 volts.

11. Disconnect DVM and connect oscilloscope Hi to TP25, Lo to TP28. Adjust R11 to give a 10mS ±1mS period, mark-space ratio 3.5 : 1.5.
(NOTE. This signal appears in short 'bursts' every reading.) Disconnect oscilloscope.

CAUTION:

The next sequence of operations (12, 13 and 14 clears the whole calibration memory, so all previou calibration information is lost. DO NOT carry out these operations unless one or more Cal. Stores is at one end of its span. (e.g. IP-0 or FAIL has been displayed.)

12. Insert calibration key into keyswitch on the back panel and turn, placing the instrument into CAL mode.
NOTE: The display CAL legend will be lit.

13. Short together pins 'D' and 'E' on Digital assembly.
NOTE: All the calibration store correction factors are now reset to zero.

14. Turn the calibration key back to RUN mode.

Analog Assembly

NOTE.

Before carrying out operations (15) to (19), ensure that the instrument has warmed up with covers on for at least 2 hours.

15. Select DC, 1V and FILTER; apply short copper link across input terminals, and connect DVM Lo to TP23, Hi to TP34. Adjust bootstrap offset R160 to reduce the voltage at TP34 to <20μV. Disconnect the DVM

16. Apply short-circuit input and press 1081 ZERO key. Repeat until display reading is .000,000 ±1 digit.

17. Connect shielded 10MΩ resistor across the Hi and Lo input terminals. The display reading is the input bias current to a resolution of tenths of a picaAmp (e.g. .000,125 represents a bias current of 12.5pA). Adjust R159 to null this reading.

18. Repeat (16) and (17) until the bias current is <10pA.

19. Repeat (15), (16) and (17) until the bootstrap and bias current are both within the specified limits without further adjustment.

20. Replace covers but do not replace screws. Apply short-circuit input. Select 1000V DC range and deselect FILTER. Turn rear panel keyswitch to CAL mode and select LIN.

21. Select 10V DC range and FILTER. Press ZERO.

22. Remove input short. Apply +10V DC to the input terminals. Press STD, repeating until display reading is +10.00000 ±1 digit.

Important Note
[Operations (23) to (35)]

The basic linearity of the 1081 DC analog circuitry is of such a high order, that it is dependent on the nature and degree of compensation applied to adjust the dielectric absorption of the main A-D integrator capacitor C9. This is done on the 10V range using FSV resistor R85 at +19V, and trimmer R23 at +2V.

The calibration source used by the manufacturer to provide the test voltages, is itself of very low noise and excellent linearity. If a Datron 4000 or 4000A is not available, any calibration source used to provide test voltages must have less than 0.5ppm of noise, and be linear to better than 0.5ppm of range. Otherwise there is little point in testing or adjusting the 1081 linearity.

Before any linearity tests, or adjustment of R23 or R85, the instrument must be warmed up with covers on for at least 2 hours. For adjustment, the top cover should be lifted for as little time as possible.

IF THE LINEARITY IS SUSPECT, AND THE ABOVE CONDITIONS CANNOT BE MET, DO NOT CARRY OUT OPERATIONS (23) TO (35). IT IS RECOMMENDED THAT THE 1081 BE RETURNED TO YOUR DATRON INSTRUMENTS SERVICE CENTER FOR TEST AND ADJUSTMENT.

23. Apply +19.000,000 volts to the input terminals and select HI RES. If the displayed reading is within the limits +18.999,980V and +19.000,020V, omit operations (24) to (34).

24. Read the Important Note above. Unsolder R85 and clean out its terminal posts. When the instrument is fully warmed up again, proceed to operation (25).

25. Reapply +19.000,000V (HI RES selected). Select values of R85 until the displayed reading is +19.000,000V ±20 digits.

26. Apply 0.000,000V and press ZERO. Repeat until the reading is 0.000,000V ±5 digits.

27. Apply +10.000,000V and press GAIN. Repeat until the reading is +10.000,000V ±5 digits.

28. Repeat operations (25) to (27) until no further reselection of R85 is necessary.

29. Apply +2.000,000V (HI RES selected). Adjust R23 until the displayed reading is +2.000,000V ±20 digits.

30. Apply 0.000,000V and press ZERO. Repeat until the reading is 0.000,000V ±5 digits.

31. Apply +10.000,000V and press GAIN. Repeat until the reading is +10.000,000V ±5 digits.

32. Repeat operations (29) to (31) until no further adjustment of R23 is necessary.

33. Repeat operations (25) to (32) until no further reselection of R85, nor adjustment of R23 is necessary.

34. Solder the selected R85 into its terminal posts. When the 1081 is warmed up, repeat operation (23).

35. Turn rear panel keyswitch to RUN mode. The basic DC-only instrument set-up procedure is complete.

4.3.2 Ohms Assembly

Equipment Required:

5½ digit DVM e.g. Datron 1065, 1061
10MΩ 5% Resistor in parallel with 10nF capacitor. e.g. Datron part No. 400392
Copper shorting links.

Procedure.

1. Select 10kΩ range, 4-wire. Connect I− to ΩGuard, I+ to Hi, and 10MΩ between Hi and Lo.

2. Connect DVM Hi to TP7, Lo to TP12, and adjust bias current R26 until TP7 voltage is zero ±100μV.

3. Connect Lo to ΩG. Connect shorting link between TP12 and TP8.

4. Connect DVM Hi to TP5 and check reading is zero ±50μV. Adjust FSV R40 if >+50μV, or FSV R39 if <−50μV.
   Note R39, R40 must be ⩾100kΩ.

5. Remove link between TP12 and TP8 and connections on front panel.

The basic Ohms set up procedure is complete.

4.3.3 AC Assembly

Equipment Required:

5mV/Div oscilloscope. e.g. Telequipment D83.
5½ digit DVM with Ohms. e.g. Datron 1065, 1061.
DC calibrator. e.g. Datron 4000 or 4000A.
AC calibrator. e.g. Fluke 5200A.
Asymetric signal, 1V RMS, Crest Factor 5:1 ±0.02%, reversible polarity.

± VOLTAGE ?

CAUTION
The following procedures should commence with the HF Autocal voltage close to the center of its span. To check this, select the 100V AC range and measure the DC voltage at J1-11 with respect to TP8. If it is between +4V and +6V it is NOT necessary to clear the calibration stores. If outside these limits, the cal stores should be cleared as described in para 4.3.1 operations (12), (13) and (14).

CLEARING THE CAL STORES ENTAILS A FULL 'AUTOCAL' OF THE INSTRUMENT!

Before proceeding; ensure that at least the Analog Assembly LIN, ZERO, and STD Autocalibrations have been carried out. (See para 4.3.1 operations 17 - 22.)

AC Preamplifier Zero

1. Read and comply with the CAUTION above.

1. Apply short circuit input. Select AC + DC, 100mV range and HOLD.

3. Connect DVM Lo to TP8, Hi to Test link K (TLK). Adjust R148 (bias current) for a reading of zero, ±140μV.

4. Select 100mV range AC, and check that the reading is zero, ±140μV. It may be necessary to re-adjust R148 to obtain this value. If so, recheck operation 3.

5. Select each range in turn, and check that the DVM reading is within ±70μV of zero (except 100mV range: ±140μV).

Set up RMS Converter

6. Select 10V range. Adjust R119 (Rectifier zero) for the most negative (or least positive) reading on the display.

7. Connect DVM to TLH. Adjust R101 (linearity) for a reading of +1.1mv±10%.

8. Select 100mV range. Check that the DVM reading is between 0.8mV and 1.8mV.

9. Select 1V range and apply 1V, 500Hz; with the DVM still connected to TLH. Refer to Fig. 4.2 and make or cut links TLC - TLF as appropriate to give a DVM reading of 3.120V ±0.025V.

TLH Voltage	Cut Test Links				Gain*
	C	D	E	F	
2.618 - 2.648	✓	✓	✓	✓	1.184
2.648 - 2.675	✓	✓	✓	x	1.172
2.675 - 2.703	✓	✓	x	✓	1.160
2.703 - 2.733	✓	✓	x	x	1.148
2.733 - 2.763	✓	x	✓	✓	1.135
2.763 - 2.793	✓	x	✓	x	1.123
2.793 - 2.824	✓	x	x	✓	1.111
2.824 - 2.857	✓	x	x	x	1.098
2.857 - 2.888	x	✓	✓	✓	1.086
2.888 - 2.923	x	✓	✓	x	1.074

*Increase in TLH voltage when links are cut.
Nominal TLH voltage: 2.753 ±5% (2.615-2.891V).

FIG. 4.2 AC ASSEMBLY OUTPUT SELECTION VOLTAGES

Check Spec Readout Frequency Flags

10. Select HOLD. Connect DVM to TP6. Adjust the applied frequency and note that TP6 changes logic state at a frequency between 1.8kHz and 2.2kHz. Note also that the TP6 voltage increases by approx. 0.3V between 18kHz and 22kHz. Disconnect the DVM.

Set Range 'Zeros'

11. Deselect HOLD, and apply 500Hz at 0.1%FR input to each range in turn. Perform ZERO autocal on each range, using the instrument display to check that each range calibrates to 100 digits ±3 digits. Disconnect the input.

12. Apply a short circuit to the input, short Guard to Lo and select each range in turn. Check that the reading on each range is zero ±10 digits on the display (except 100mV range: ±30 digits). Remove the shorts.

Set up DC-DC Turnover

13. Select 1V range, AC + DC. Apply 1V 500Hz and perform GAIN autocal.

14. Apply +1V DC and note the displayed reading.

15. Apply −1V DC and adjust R62 (DC turnover) for the same reading as in operation (14). (±3 digits).

16. Repeat (13) to (15) until all readings are the same to within ±20 digits.

Set up Coarse Frequency Response

17. Select 100V range, AC; apply 100V, 500Hz and perform GAIN autocal. Apply 100V, 50kHz and adjust C82 for a display reading of 100.000V ±20 digits. (If necessary change C81 to a value which permits this adjustment).

18. Apply 100V, 100kHz and note the reading error. Adjust C79 to give 5 times the error in the same direction.

19. Repeat (17) and (18) until the 50kHz and 100kHz readings are separated by less than 20 digits.

20. Select 1V range, AC; apply 1V, 500Hz and perform GAIN autocal. Apply 1V, 50kHz and adjust C84 for a display reading of 1.00000V ±20 digits. (If necessary change C85 to a value which permits this adjustment).

Set up Crest Factor

21. Apply 1VRMS, +ve 5:1 Crest Factor signal. Adjust R61 (crest factor) for a display reading of 1.00000V ±30 digits.

22. Apply 1VRMS, −ve 5:1 Crest Factor signal. Check that display reading is 1.00000V ± 0 digits.

23. Apply 1V, 500Hz, and perform GAIN Autocal. Repeat (21), (22) and (23) until crest factor readings are within limits.

Linearity Checks

24. Select 1V range, AC + DC. Apply 1V DC and perform GAIN Autocal.

25. Apply 1.9VDC and adjust R27 value (Factory Selected Value - FSV) for a display reading of 1.90000V ±6 digits (reducing R27 increases reading).

26. Repeat (24) and (25) until both correct.

27. Select 1V range AC. Apply in turn 1V, 100mV, 10mV, at 500Hz and check that display reading is correct to within ±10 digits of the input voltage.

28. Apply open circuit input, set CAL/RUN switch to RUN; press '→', 'Test' and check for a display of 'PASS'.

Set up Output Buffer Input Current

29. Select 1V range, AC + DC, no filter. Apply 1V DC and set CAL switch to RUN. Use the 'A-B' computation mode to null out the reading: press STORE, B, then (A-B).

30. Select 0.1 Hz filter, and leave to settle for two minutes. Check that the displayed reading is within ±50 digits of zero.

31. Adjust R50, in small steps, to null out the reading error. Allow time for the reading to settle after one step before passing on to the next. Turn clockwise to make the reading more positive.

32. Repeat (29) to (31) until the difference is reduced to less than 10 digits.

33. Repeat (28).

The AC set-up procedure is now complete.

APPENDIX 1

ANALOG DATA LINE ‘F.E.T.’ PATTERNS

DC Voltage (IEEE 488 code F3)

Range		DC Isolator							
R		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1	100mV	0	0	0	0	0	1	1	X
2	100mV	0	0	0	0	0	1	1	X
3	IV	0	0	0	0	1	1	1	X
4	10V	0	0	0	0	1	0	1	X
5	100V	0	0	0	0	1	1	0	X
6	1000V	0	0	0	0	1	0	0	X
7	1000V	0	0	0	0	1	0	0	X

AC Voltage (IEEE 488 code F2)

Range		AC assembly							
R		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1	100mV	0	0	X	0	0	0	1	0
2	100mV	0	0	X	0	0	0	1	0
3	1V	0	0	X	0	0	0	0	0
4	10V	0	0	X	1	0	0	0	1
5	100V	0	0	X	0	1	0	0	1
6	1000V	0	0	X	0	0	1	0	1
7	1000V	0	0	X	0	0	1	0	1

DC Coupled AC Voltage (IEEE 488 code F6)

Range		AC assembly							
R		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1	100mV	0	1	X	0	0	0	1	0
2	100mV	0	1	X	0	0	0	1	0
3	1V	0	1	X	0	0	0	0	0
4	10V	0	1	X	1	0	0	0	1
5	100V	0	1	X	0	1	0	0	1
6	1000V	0	1	X	0	0	1	0	1
7	1000V	0	1	X	0	0	1	0	1

AC Filter Selection (IEEE 488 codes F2 C0-C3)

Filter	AD1/F1	AD0/F0	A1	A0	S1	S2	S3	S4
.1 Hz	1	1	0	0	1	0	0	0
1 Hz	1	0	0	1	0	1	0	0
10 Hz	0	1	1	0	0	0	1	0
100 Hz	0	0	1	1	0	0	0	1

Ohms (IEEE 488 code F1)

Range	DC Isolator								Ohms assembly							
R	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1 10Ω	0	0	0	0	0	1	1	X	0	0	0	0	0	0	1	X
2 100Ω	0	0	0	0	1	1	1	X	0	0	0	0	0	0	1	X
3 1kΩ	0	0	0	0	1	1	1	X	0	0	0	0	0	1	0	X
4 10kΩ	0	0	0	0	1	1	1	X	1	0	0	0	0	0	0	X
5 100kΩ	0	0	0	0	1	1	1	X	0	0	0	0	1	0	0	X
6 1MΩ	0	0	0	0	1	1	1	X	0	0	1	1	0	0	0	X
7 10MΩ	0	0	0	0	1	1	1	X	0	1	0	1	0	0	0	X
PRT and kΩPRT (IEEE 488 codes F4 and F5)																
PRT kΩPRT	0	0	0	0	0	1	1	X	0	0	0	0	0	1	0	X

TEST (IEEE 488 code Y)

Function Tested	Range Checked	Voltage Measurement								Option assembly							
		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
DC		DC Isolator								No Option Required							
	.1	0	0	0	0	0	1	0	1								
	1	0	0	0	0	1	1	0	1								
	10	0	0	0	0	1	0	0	1								
kΩ	10M	DC Isolator								Ohms assembly							
		0	0	0	0	1	1	1	1	0	1	0	1	0	0	0	1
AC		AC assembly - J1 (Ranging)								AC assembly - J2 (Filters)							
	.1	0	0	X	0	0	0	1	0	0	0	X	X	X	X	X	X
	1	0	0	X	0	0	0	0	0	0	0	X	X	X	X	X	X

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M43	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	–
M44	270048	QUAD 2 I/P NAND GATE	NATIONAL	74 LS 00	–
M45	270050	HEX INVERTER	"	74 LS 04	1
M46	280025	QUAD BILATERAL SWITCH	MOTOROLA	MC14066BCP	–
M47	280070	DIVIDE-BY-8 COUNTER/DIVIDER	MULLARD	HEF 4022P	1
M48	280071	TRIPLE 3 I/P NOR GATE	"	HEF 4025P	–
M49	280023	QUAD 2 I/P NOR GATE	MOTOROLA	MC14001 BCP	1
M50		NOT USED			–
M51		NOT USED			–
M52	270056	8 I/P NAND GATE	NATIONAL	74 LS 30	1
M53	280061	MICRO PROCESSOR CHIP	MOTOROLA	MC 6800L	1
M54	270023	QUAD 2 I/P NAND GATE	NATIONAL	7437	1
M55	270054	QUAD 2 I/P AND GATE	"	74 LS 08	2
M56	270054	" " " "	"	"	–
M57	270057	DUAL JK FLIP-FLOP	"	74 LS 76	1
M58	280009	HEX INVERTER/BUFFER	MOTOROLA	MC 14049	2
M59	280009	HEX INVERTER/BUFFER	MOTOROLA	MC 14049	–
M60, M62	260031	VOLTAGE DETECTOR	INTERSIL	ICL 8211	2
M61	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	–
S1		NOT USED			–
S2		NOT USED			–
S3		NOT USED			–

NOTES.

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TITLE 1081 DIGITAL PCB ASSY.

DRAWING NUMBER 400526 SHEET 14 OF 16

JW. 1304

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
L1	370004	100 µH R.F. CHOKE	SIGMA	SC10/100	1
	590004	SLEEVE – PTFE	HELLERMANN ELECTRIC	FE10	A/R
	590055	SLEEVE Ø 1·0 SIL. RUBBER	" "	H15 CONT. BLACK	10mm
	540002	22 SWG. BTC WIRE			A/R
	920048-1	BUS STRIP	MEKTRON	M823 14 7. 3F	1
	613018	4BA NYLON WASHER			2
	630098	COMPONENT CLIP	RICHCO	KKU-8	1
	606005	CLIP FOR 605002	ANTIFERENCE	RC 74	3
J1, J2, J4	605002	16 WAY D.I.L. LOW PROFILE SKT.	JERMYN OR ANTIFERENCE	A23-2001/Y OR ICN-163-S3	3
	605065	28 WAY D.I.L. " " "	AUGAT	328-AG39D	1
	605060	14 WAY D.I.L. SOCKET	ASTRALUX OR JERMYN	ICL 143-S3T	22
	605061	16 WAY D.I.L. SOCKET	" "	ICL 163-S6T	24
	605050	40 WAY D.I.L. SOCKET	AUGAT	340 - AG39D	1
	605063	22 WAY D.I.L. SOCKET	AUGAT	322 - AG39D	2
	605064	24 WAY D.I.L. SOCKET	"	324 - AG39D	3
	605062	18 WAY D.I.L SOCKET	"	318 - AG39D	2
JL3	604037	PROGRAMMING CLASS 160 PLUG	"	8136-475G8	1
	605059	8 WAY D.I.L. SOCKET	ASTRALUX	ICL-083-S6T	1
J5	605052	8 WAY POLARISED SOCKET	"	22-01-2085	1
	617010	NYLATCH PLUNGER	ORDER FROM GJ FOX & SONS	HN3P-32-4-1	8
	617011	NYLATCH GROMMET	" " " "	HN3G-32-1	8
J3	605102	24 WAY D.I.L SOCKET GOLD	CA	CA-24S-10SD	1
	410096-10	PCB			1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	090001	P.T.C. THERMISTOR	MULLARD	VA 8650	2
R2	090001	P.T.C. THERMISTOR	MULLARD	VA 8650	–
R3	000151	150 Ω 1/4 W CARBON	MULLARD	CR25	8
R4	000151	150Ω " " "	"	"	–
R5	000151	150Ω " " "	"	"	–
R6	000102	1K 1/4 W. CARBON	"	CR25	1
R7	000104	100K 1/4 W. CARBON	MULLARD	CR25	1
R8	000151	150 Ω 1/4 W. CARBON	MULLARD	CR25	–
R9	000151	150Ω " " "	"	"	–
R10	000151	150 Ω " " "	"	"	–
R11	000151	150Ω " " "	"	"	–
R12	000151	150Ω " " "	"	"	–
AN1	090032	150R x 7 2% NETWORK	BECKMAN	764 - 1 - R150	2
AN2	090032	" " " "	"	"	–
C1	102101	100 PF CER DISC	ERIE	801	1
C2	150002	10 μF 20% 16V DIP TANT	UNION CARBIDE	K10E16	2
C3	150016	1·0 μF 20% 35V "	UNION CARBIDE	K1R0E35	2
C4	101103	0·01μF 250V CER DISC	ERIE	801	3

NOTES CIRCUIT DIAG 430294
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DATE	–	17-8-78	29-9-78	6-12-78	25-JAN 79	11 JUN 79	26 OCT 79	21.4.80	11-6-81	1-7-82	2.6.83
CHKD	–	MD				MD	MD	MD	MD	MD	MD

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SHEET 2 OF 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C5	101103	0·01μF. 250V CER DISC	ERIE	801	–
C6	150016	1·0 μF 20% 35V DIP TANT	UNION CARBIDE	K1R0E35	–
C7	101103	0·01μF 250V CER DISC	ERIE	801	–
C8	150002	10μF 20% 16V. DIP. TANT	UNION CARBIDE	K10E16	–
C9	104023	2n2F 20% 1KV CER DISC	ITT	HD16K102N2MS-SS1K0DSC	1
C10	102472	4n7F 25% 500V CER DISC	ITT	CD10	1
Q1	240001	Si NPN	NATIONAL	BC184K	6
Q2	240001	Si NPN	NATIONAL	BC184K	–
Q3	240001	" "	"	"	–
Q4	240001	" "	"	"	–
Q5	240001	" "	"	"	–
Q6	240001	" "	"	"	–
M1	290042	G.P. HIGH CURRENT TRANS ARRAY	R.C.A.	CA3081P	3
M2	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013 BCP	1
M3	290042	G.P. HIGH CURRENT TRANS ARRAY	R.C.A	CA3081P	–
M4	280015	QUAD LATCH	MOTOROLA	MC14076	7

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M5	280015	QUAD LATCH	MOTOROLA	MC14076	—
M6	280015	" "	"	"	—
M7	280067	16WAY. KEYBOARD ENCODER	NATIONAL	MM74C922	2
M8	280015	QUAD LATCH	MOTOROLA	MC14076	—
M9	280015	QUAD LATCH	"	"	—
M10	280067	16 WAY. KEYBOARD ENCODER.	NATIONAL	MM74C922	—
M11	280015	QUAD LATCH	MOTOROLA	MC14076	—
M12	280015	" "	"	"	—
M13	290042	G.P. HIGH CURRENT. TRANS ARRAY	RCA	CA3081P	—
S1	700019	SLIDE SWITCH	SIEMENS	C-42315-A60-A1	2
S2	700019	" "	"	"	—
S3	700061	KEYBOARD SWITCH. RED. LED.	SCHADOW	SRL-RED LED	24
S4	700061	" " " "	"	" " "	—
S5	700061	" " " "	"	" " "	—
S6	700061	" " " "	"	" " "	—
S7	700061	" " " "	"	" " "	—
S8	700061	" " " "	"	" " "	—
S9	700061	" " " "	"	" " "	—
S10	700062	KEYBOARD SWITCH. GREEN LED	SCHADOW	SRL - GREEN LED	2

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
S11	700061	KEYBOARD. SWITCH. RED. LED.	SCHADOW	SRL - RED LED	—
S12	700061	" " " "	"	" " "	—
S13	700061	" " " "	"	" " "	—
S14	700061	" " " "	"	" " "	—
S15	700061	" " " "	"	" " "	—
S16	700061	" " " "	"	" " "	—
S17	700061	" " " "	"	" " "	—
S18	700061	" " " "	"	" " "	—
S19	700061	" " " "	"	" " "	—
S20	700061	" " " "	"	" " "	—
S21	700061	" " " "	"	" " "	—
S22	700061	" " " "	"	" " "	—
S23	700061	" " " "	"	" " "	—
S24	700061	" " " "	"	" " "	—
S25	700061	" " " "	"	" " "	—
S26	700061	" " " "	"	" " "	—
S27	700061	" " " "	"	" " "	—
S28	700062	KEYBOARD SWITCH. GREEN. LED.	SCHADOW	SRL-GREEN LED	—

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	410090-4C	PRINTED CIRCUIT BOARD			1
	450179-1	TERMINAL PLATE.			1
	605060	IC. SOCKET 14 WAY	AUGAT	314-AG-39D	1
	605061	IC. SOCKET 16 WAY	AUGAT	316-AG-39D	10
	605062	IC. SOCKET 18 WAY	AUGAT	318-AG-39D	2
	540002	22 SWG TIN CU WIRE			A/R
	630024	INSULATING BEADS			8
	800017	8½ DIGIT DISPLAY	DALE		1
	920015	LOW. E.M.F. TERM. BLK/BLK	CLIFF	TPI - SPECIAL	1
	920041	" " " BLK/RED	CLIFF	" "	1
	920042	NOT LOW E.M.F. TERM BLK/WH	"	TPI	1
	920043	" " " " BLK/BRN	"	"	1
	920044	" " " " BLK/BLUE	"	"	1
	920045	" " " " BLK/YELLOW	"	"	1
	630029	DOUBLE SIDED PRESSURE SENSITIVE TAPE.	3M	TYPE 4032	290mm
	420080-1	WARNING LABEL			1
	590004	SLEEVE - PTFE	HELLERMANN	FE10	45mm
	613009	SOLDER TAG 4BA TINNED BRASS	R.S.		4
	590032	HEATSHRINK ϕ4·8 YELLOW			A/R
	590006	HEATSHRINK SLEEVE ϕ2·4 INT	RS OR HELLERMANN ELECTRIC	399-495 OR LVR24	A/R

NOTES

SEE SHEET 1 FOR LATEST ISSUE

ISS											
ECN											
DATE											
CHK											

datron ELECTRONICS LTD

DRAWN B.J.P.
CHECKED
APPROVED
DATE

TITLE 1061/71/81 FRONT. P.C.B. ASSY.

DRAWING NUMBER 400294

SHEET 6 OF 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1		NOT USED			—
R2	066200	20R POT 3/8 SQ. VERT. CERMET.	BECKMAN	72XW	1
R3	000221	220R. 5% 1/4W CARBON.	MULLARD	CR25	1
R4	014320	432R 1% M.F.	HOLCO	H.8	1
R5	000102	1K 5% 1/4W CARBON	MULLARD	CR25	2.
R6	001184	180K 5% 1/2W CARBON	MULLARD	CR37	1
R7	066102	1K 3/8" RIGHT ANGLED CER. POT.	BECKMAN	72XW	1
R8	014021	4K02 1% 1/8W M.F.	HOLCO	H.8.	1
R9	019091	9K09 1% 1/8W M.F.	HOLCO	H.8.	1
R10	012001	2K 1% 1/8W M.F.	HOLCO	H.8.	1
R11	011302	13K 1% 1/8W M.F.	HOLCO	H.8.	1
R12	066501	500R 3/8" RIGHT ANGLED CER. POT.	BECKMAN	72XW	1
R13.	000102	1K 5% 1/4W CARBON.	MULLARD.	CR25	—
L1	370001	10μH 0·85Ω R.F. CHOKE.	PLESSEY	58/10/0011/10	3
L2	370001	10μH " "	"	"	—
L3	370001	10μH " "	"	"	—
C1	NOT USED				—
C2	NOT USED.				—
C3	NOT USED.				—

NOTES CIRCUIT DIAG. 430295.
CHECK PROC. 460295.
CHECK LIST. 470295.

SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1 c	2	3^{c}	4	5	6	7	8	9	10	11
ECO	-	-	RELEASED	ECO783	ECO 816	876 882 900	931 934A	1085 1097	1441	1452	1470	1517	1529
DATE	-	22-8-78	29-9-78	8-12-78	25 JAN 79	6. JUN 79	31-10-79	21.4.80	11-2-83	16.2.83	1.6.83	16·8·83	15·9·83
CHKD	-	MD		MD	M	MD	MD	MD	MD	MD	MD		MD

DATE 2-5-78
DRAWN B.J.
CHECKED M.A.H.
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1061/1071/1081 REAR P.C.B. ASSY.
DRAWING NUMBER 400295
SHEET 2 OF 6

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
C4		NOT USED			
C5	101103	0·01μF 250V CER DISC	ERIE	801	3
C6	180026	10μF 350V ELECT	ITT	EN12/12 10/350	1
C7	180004	4700μF 16V AL. ELECT	WIMA	PRINTILYT	1
C8	104026	47nF $^{+50}_{-20}$% 50V CER DISC	SIEMENS	B37449	1
C9	150003	47μF 20% 6V3 DIP TANT	UNION CARBIDE	K47E 6V3	1
C10	150021	22μF 20% 25V DIP. TANT	UNION CARBIDE	K22E25	2
C11	150021	" " " "	"	"	—
C12	101103	0·01μF 250V. CER. DISC.	ERIE	801	—
C13	180025	1000μF 35V. ELECT.	WIMA	PRINTILYT	2
C14	101103	0·01μF 250V. CER DISC	ERIE	801	—
C15	180025	1000μF 35V ELECT	WIMA	PRINTILYT	—
C16	102102	1nF 10% 500V CER DISC	ITT	CD10.	1
D1	200022	Si RECTIFIER 3A 400V	MOTOROLA	BY252	2
D2	200022	" "	"	"	—
D3	210068	6V8 400mW ZENER	MULLARD	BZY88C6V8	1
D4	213004	180V 500mW ZENER	MOTOROLA	1N5279B	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS
ECO
DATE
CHKD

DATE 2-5-78
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DATE

datron ELECTRONICS LTD
TITLE 1061/71/81 REAR P.C.B ASSY.
DRAWING NUMBER 400295
SHEET 3 OF 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q1	240018	300V. N.P.N. TRANSISTOR	MOTOROLA	MJE 340	2
Q2	240018	" " "	"	"	—
M1	260068	5V 1½A REGULATOR	NATIONAL	LM309K/ALUM	1
M2	260024	POSITIVE VOLTAGE REGULATOR	FAIRCHILD	μA 78 MGUIC	1
M3	260023	NEGATIVE VOLTAGE REGULATOR	FAIRCHILD	μA 79 MGUIC	1
W1	209014	1A5 400V BRIDGE RECT	MICRO ELECTRONICS	W004	1
W2	209004	100V. 1A . BRIDGE RECT	GENERAL INSTRUMENT	W01	1
J1					
J2	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	5
J3	604033	4 WAY FLAT GOLD WAFER PIN	MOLEX	22-27-2041/GOLD	17
J4	604033	" " " " "	"	" " "	—
J5	604033	" " " " "	"	" " "	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS										
E.C.O										
DATE										
CHKD										

DATE 2-5-78
DRAWN B.J.
CHECKED MLM
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DATE

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TITLE 1061/71/81 REAR P.C.B. ASSY.
DRAWING NUMBER 400295
SHEET 4 OF 6

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
J6	604033	4WAY FLAT GOLD WAFER PIN	MOLEX	22-27-2041/GOLD	—
J7	604033	" " " " "	"	"	—
J8					
J9	604033	4 WAY FLAT GOLD WAFER PIN	MOLEX	22-27-2041/GOLD.	—
J10	604033	" " " " "	"	"	—
J11	604033	" " " " "	"	"	—
J12	604033	" " " " "	"	"	—
J13	604033	" " " " "	"	"	—
J14					
	410091-5A	PRINTED CIRCUIT BOARD			1
	450180-2	HEATSINK 5V	ADVANCE		1
	450183-1	HEATSINK 15V	ADVANCE		3
	540002	22SWG TIN CU WIRE			A/R
	540008	7/·2 PTFE WIRE WHITE		BSG210 TYPE C	A/R
	611037	SCREW M3x8mm. NYLON HEX. HD.	NYLON & ALLOYS		8
	613005	WASHER M3 INT/SHAKEPROOF. ST.	GKN DISTRIBUTORS		4
	613017	WASHER M3 FLAT NYLON	NYLON & ALLOYS		8
	615002	NUT. M3 FULL HEX STEEL	GKN	ZINC PLATED	4
	615008	NUT. M3 FULL HEX NYLON	GKN		2

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS.													
E.C.O													
DATE													
CHKD													

DATE 2-5-78
DRAWN B.J.
CHECKED MLM
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1061/71/81 REAR P.C.B. ASSY
DRAWING NUMBER 400295
SHEET 5 OF 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	611016	SCREW M3x8mm STEEL POZI-PAN ZINC PL	GKN		6
	618007	MELINEX WASHERS 12·7x16·5x0·05mm.	JERMYN.	J26-5001	2
	620007	TEST POINT TERMINAL	MICROVAR	C30	9
	618001	INSULATING BUSH	JERMYN	A1218	2
	618009	INSULATING PAD SIL TO3	WARTH	3223-07FR-06	1
	590004	SLEEVE - PTFE	HELLERMANN ELECTRIC	FE10	A/R.
	900004	SILICONE RUBBER COMPOUND	R.S.	554-119.	A/R
	420080-1	WARNING LABEL			2.
	613029	M3 CRINKLE WASHER SS			2
	613009	4BA SOLDER TAG BRASS	TIN PL.		2
	590001	SLEEVE MAX. CABLE ø3·0	HELLERMANN ELECTRIC	H15x20mm BLACK HELSYN	3
	590006	HEATSHRINK SLEEVE ø2·4 INT	RS OR HELLERMANN ELECTRIC	399-495 OR LVR24	20mm

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS											
ECO											
DATE											
CHKD											

DATE 2-5-78
DRAWN B.J.
CHECKED MKH
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1061/71/81
REAR P.C.B ASSY
DRAWING NUMBER 400295
SHEET 6 OF 6

J.W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
J2	572115 /C	16 WAY RIBBON CABLE ASSY	DATRON.		1
J3	604035	4CCT. RIGHT ANGLED WAFER. GOLD.	MOLEX.	22-12-2041.	5
J4	604035.	" " " "	"	"	—
J6	604035.	" " " "	"	"	—
	410092-5A	P.C.B.			1
J1 & J5	604036	STRIP OF 10 AMP PINS	AMP	163740-8	4
	630023	SCOTCHFLEX ADHESIVE CLIP	3M	CLIP 706.	1
	630099	25mm MASKING TAPE	3M	SCOTCH N.230	A/R.
	620007	TEST POINT TERMINAL	MICROVAR	C 30	2
R1	000473	47K 5% ¼W CARBON	MULLARD	CR25	2
R2	000473	47K " " "	"	"	—
D1	200002	Si RECTIFIER 1A 50V	FAIRCHILD	IN4001	2
D2	200002	" " " "	"	"	—

NOTES CIRCUIT DIAGRAM . 430296
CHECK PROC. . 460296.
CHECK LIST . 470296.
SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1 C	2	3	4	5	6	7	8
E.C.O.	—	—	RELEASED	ECO784	ECO849	867/904	992	1000	1102	1217
DATE	—	25-8-78	29-9-78	6-12-78	4-5-79	11-6-79	25-10-79	18.1.80	14.4.80	18·8·81
CHKD	—	MD		MD	MD	MP	MD	ND	MD	MP

DATE 2-5-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061/71/81
CENTRE P.C.B. ASSY

DRAWING NUMBER 400296 SHEET 2 OF 2

JW 1/64

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
J2	604035	RIGHT ANGLED WAFER PIN. GOLD.	MOLEX	22-12-2041	12
J3	604035	" " " "	"	"	—
J4	604035	" " " "	"	"	—
J5	604035	" " " "	"	"	—
J6	604035	" " " "	"	"	—
				"	—
	410093-4	PRINTED CIRCUIT BOARD			1
	510111	7/0·2 BROWN WIRE			120 mm
J1 & J7	604036	STRIP OF 10 AMP PINS	AMP	163740-8	2
	605053	12 WAY POLARISED SOCKET	MOLEX	22-01-2125	2
	605057	GOLD CRIMP PINS	MOLEX	4809-GL	7
	606004	PLASTIC POLARISING PEG	MOLEX	4161-1	4
	540002	22 S.W.G. TIN.CU.WIRE			A/R
	590001	SLEEVE MAX CABLE Ø3·0	HELLERMANN ELECTRIC	H15 x 20mm BLK HELSYN	1

NOTES. CIRCUIT DIAGRAM . 430297.
CHECK PROC. . 460297.
CHECK LIST . 470297.
SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1	2
E.C.O	-	—	RELEASED	867
DATE	-	24-8-78	29-9-78	11-6-79
CHKD	-	MD		MD

DATE 28-4-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061/71/81
L.H. PCB ASSEMBLY

DRAWING NUMBER

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000334	330K 5% 1/4W CARBON	MULLARD	CR25	2
R2	000334	" " " "	"	"	–
	410094-4A	P.C.B.			1
	540002	22SWG TIN. CU. WIRE.			A/R
J2	574270/C	24WAY RIBBON CABLE ASSY	DATRON		1
J1 & J3	604036	STRIP OF 10AMP PINS	AMP	163740-8.	4
	590001	SLEEVE MAX CABLE Ø 3·0	HELLERMANN ELECTRIC	H15x20mm BLK. HELSYN	2
	630099	25mm MASKING TAPE.	3M	SCOTCH N.230	A/R

NOTES CIRCUIT DIAGRAM - 430298
CHECK PROC. - 460298
CHECK LIST - 470298

SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1^{c}	2	3	4	5	6
ECO	–	–	RELEASED	ECO850	867/904	943	1217	1474
DATE	–	24-8-78	29-9-78	4-5-79.	11-6-79.	10.9.79	18·8·81	3.6.83
CHKD	–	MD		MD	MD	MD	MD	

DATE 28-4-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061/71/81
R.H. P.C.B. ASSEMBLY

DRAWING NUMBER 400298 SHEET 2 OF 2

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
1	000472	4k7 5% ¼W CARBON	MULLARD	CR25	4
.2	000103	10k " " "	"	"	3
R3	000183	18k " " "	"	"	1
R4	000103	10k " " "	"	"	-
R5	000104	100k " " "	"	"	1
R6	000103	10k " " "	"	"	-
R7	000102	1k " " "	"	"	20
R8	000102	1k " " "	"	"	-
R9	000102	1k " " "	"	"	-
R10	000102	1k " " "	"	"	-
R11	000102	1k " " "	"	"	-
R12	000102	1k " " "	"	"	-
R13	000102	1k " " "	"	"	-
R14	000102	1k " " "	"	"	-
R15	000102	1k " " "	"	"	-
R16		NOT USED			-
R17		NOT USED			-
R18	000102	1k " " "	"	"	-
R19	000102	1k " " "	"	"	-
R20	000102	1k " " "	"	"	-
R21	000472	4k7 " " "	"	"	-
R22	000272	2k7 " " "	"	"	5
R23	000472	4k7 " " "	"	"	-

NOTES. CIRCUIT DIAGRAM = 430301
CHECK PROCEDURE = 460301
CHECK LIST = 470301

SEE SHEET 2 FOR LATEST ISSUE

ISS.	C	1	2	3	4	5	6	7	8			
E.C.O.	-	-	789	822	854	904	1000 1025	1217	1253			
DATE	28.4.78	29.9.78	17 Nov 78	19-FEB79	8 MAY 79	21.6.79	3-1-80	17.8.81	2.12.81			
CHKD.	-	PRV	MSD	[illegible]	MD	MD	MD	MD	MD			

DATE 28.4.78
DRAWN IL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1071 1081 DISPLAY DRIVER PCB. ASSY.

DRAWING NUMBER 400301

SHEET 2 OF 7

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R24	000272	2k7 5% ¼W CARBON	MULLARD	CR25	-
R25	000272	2k7 " " "	"	"	-
R26	000272	2k7 " " "	"	"	-
R27	000182	1k8 " " "	"	"	1
R28	000222	2k2 " " "	"	"	1
R29	000272	2k7 " " "	"	"	-
R30	000102	1k " " "	"	"	-
R31	000102	1k " " "	"	"	-
R32	000102	1k " " "	"	"	-
R33	000102	1k " " "	"	"	-
R34	000102	1k " " "	"	"	-
R35	000102	1k " " "	"	"	-
R36	000102	1k " " "	"	"	-
R37	000102	1k " " "	"	"	-
R38	000472	4k7 " " "	"	"	-
R39	000393	39k " " "	"	"	1
R40		NOT USED			-
R41	000563	56K 5% ¼W CARBON	MULLARD	CR25	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS.												
E.C.O.												
DATE												
CHKD.												

DATE
DRAWN
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DATE

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TITLE 1071 1081 DISPLAY DRIVER PCB. ASSY.

DRAWING NUMBER 400301

SHEET 3 OF 7

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C1	150020	10µF. 20%. 25V DIP TANT	UNION CARBIDE	KIOE 25	3
C2	110005	0·01µF. 20% 250V POLYESTER	MULLARD	C280 AE/PIOK	4
C3-C11	110013	0·1µF 20%. 250V POLYESTER	MULLARD	C280 AE/PIOOK	9
C12		NOT USED			–
C13	110005	0·01µF 20% 250v "	MULLARD	C280 AE/PIOK	–
C14	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10 E25	–
C15	110005	0·01µF 20% 250v POLYESTER	MULLARD	C280 AE/PIOK	–
C16	110005	0·01µF 20% 250v POLYESTER	MULLARD	C280 AE/PIOK	–
C17	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10 E25	–
C18	180019	10µF 20% 250v AL ELEC	ITT	JF10 100S 250 AA	1
D1		NOT USED			–
D2	200001	Si GP DIODE	FAIRCHILD	IN4148	10
D3	200001	" " "	"	"	–
D4	200001	" " "	"	"	–
D5	200001	" " "	"	"	–
D6	200001	" " "	"	"	–
D7	200001	" " "	"	"	–
D8	200001	" " "	"	"	–
D9	200001	" " "	"	"	–
D10	200001	" " "	"	"	–
D11	200001	" " "	"	"	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS.	
E.C.O.	
DATE	
CHKD	

DATE	datron ELECTRONICS LTD
DRAWN	TITLE 1071 1081 DISPLAY DRIVER PCB ASSY
CHECKED	
APPROVED	DRAWING NUMBER 400301
DATE	SHEET 4 OF 7

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D12	213005	DIODE ZENER 75V. ½W.	MOTOROLA	BZX79C75	1.
Q1	250009	Si PNP TRANSISTOR	NATIONAL	2N5401	11
Q2	250009.	" " "	"	"	–
Q3	250009	" " "	"	"	–
Q4	240009	" NPN "	"	MPSL01	9
Q5	240009	" " "	"	"	–
Q6	240009	" " "	"	"	–
Q7	240009	" " "	"	"	–
Q8	240009	" " "	"	"	–
Q9	240009	" " "	"	"	–
Q10	240009	" " "	"	"	–
Q11	240009	" " "	"	"	–
Q12	240009	" " "	"	"	–
Q13	250009	" PNP "	"	2N5401	–
Q14	250009	" " "	"	"	–
Q15	250009	" " "	"	"	–
Q16	250009	" " "	"	"	–
Q17	250009	" " "	"	"	–
Q18	250009	" " "	"	"	–
Q19	250009	" " "	"	"	–
Q20	250009	" " "	"	"	–
			"	"	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS.	
E.C.O.	
DATE	
CHKD	

DATE	datron ELECTRONICS LTD
DRAWN	TITLE 1071 1081 DISPLAY DRIVER PCB. ASSY.
CHECKED	
APPROVED	DRAWING NUMBER 400301
DATE	SHEET 5 OF 7

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	606001	LOCKING HOOD	PYE CONNECTORS	MHN	1
	606002	NUT	" "	MN	1
	606003	WASHER	" "	MLW	1
	612019	STANDOFF LOCKING TYPE 7/8" NYLON:	RICHCO	LCBS-14R	4
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	2
	630024	INSULATING BEADS, STEATITE.		(TYPE No2)	8.
	620007	TEST POINT TERMINAL	MICROVAR	C30	5
*	604006	5 WAY PLUG	PYE CONNECTORS.	M5P.	1.
*	611016	SCREW POSI-PAN M3×8			4
*	613005	SHAKEPROOF WASHER M3			4

NOTES: * FITTED AT FINAL ASSEMBLY.

SEE SHEET 2 FOR LATEST ISSUE

ISS												
ECO												
DATE												
CHKD												

DATE 28-11-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE ANALOGUE OUTPUT P.C.B ASSY.

DRAWING NUMBER 400308
SHEET 4 OF 4

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M1	280062	128 × 8 BIT STATIC RAM	MOTOROLA	MC 6810 A	1
M2	280015	QUAD LATCH	NATIONAL	MM 74C173N	2
M3	280015	" "	"	"	–
M4	280023	QUAD 2 I/P NOR GATE	MOTOROLA	MC 14001 BCP	2
M5	280023	" " " "	"	"	–
M6	280024	TRI-STATE HEX NON-INV. BUFFER	"	MC14503 BCP	2
M7	280024	" " " " " "	"	"	–
M8	280059	DUAL BINARY UP COUNTER	"	MC 14520 BCP	1
M9	270045	QUAD 2-1 DATA SELECT LS TTL	NATIONAL	SN74 LS 157	1
M10	280033	8 CHANNEL DATA SELECT	MOTOROLA	MC 14512 BCP	1
M11	280043	4 BIT LATCH/4 TO 16 LINE DECODER	"	MC 14515 BCP	1
M12	270048	QUAD 2 I/P NAND LS TTL	NATIONAL	SN74 LS00	1
M13	280077	HEX GATE	MOTOROLA	MC14572	1
J1	571095/C	16 WAY AP/3M RIBBON CABLE	DATRON	—	1
J2	605102	24 WAY DIL SKT. GOLD	CA	CA 24S 106D	1
	605060	14 WAY DIL SOCKET	ASTRALUX OR JERMYN	ICL 143 - S3T	3
	605061	16 WAY DIL SOCKET	"	ICL 163 - S6T	8
	605064	24 WAY DIL SKT. TIN PLATE	AUGAT	324 - AG 39D	2
AN2 - AN4	090065	330K×7 2% RESISTOR NETWORK.	BECKMAN	764-1-R330K	3

NOTES.

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TITLE
1071 DISPLAY DRIVER
1081 PCB. ASSY.

DRAWING NUMBER 400301 SHEET 6 OF 7

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	410097-5A	PCB			1
	617010	NYLATCH - PLUNGER	ORDER FROM C.J. FOX & SONS	HN3P - 32 - 4 - 1	4
	617011	NYLATCH - GROMMET	" " " "	HN3G - 32 - 1	4
TP1 – TP6	540001	22 SWG. BTC. WIRE			A/R
	590004	SLEEVE - PTFE	HELLERMANN ELECTRIC	FE10	A/R
	620007	TEST POINT TERMINAL	MICROVAR	C30	5

NOTES

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1071 DISPLAY DRIVER
1081 PCB ASSY.

DRAWING NUMBER 400301 SHEET 7 OF 7

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000102	1KO 5% 1/4W CARBON	MULLARD	CR25	1
R2	000682	6K8 " " "	"	"	1
R3	090001	PTC THERMISTOR	MULLARD	VA8650	2
R4	090001	" "	"	"	–
R5	066102	1KO 3/8" SQ VERTICAL POT	BECKMAN	72XW	1
R6	000104	100K 5% 1/4W CARBON	MULLARD	CR25	1
R7	070128	21K51 0·1% WIRE WOUND	MANN	MX 125	1
R8	070066	10K 0·1% WIRE WOUND	MANN	MX 125	1
C1	101103	0·01µF 250V CER DISC	ITT	CD10K31N00JS SS5005C	2
C2	101103	0·01µF " " "	"	"	–
C3 *	102330	33pF 500V CER DISC	ITT	CD10PG33P0JS SS5005C	1 *
C4	102330	33pF " " "	"	"	1
C5	110013	0·1µF 20% 250V POLYESTER	MULLARD	C280AE/P100K	1

NOTES. * ONLY REQUIRED WHEN M1 ALTERNATIVE (TYPE 101) IS USED.
CCT DIAG. 430308
CHECK PROC 460308. CHECK LIST 470308
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TITLE ANALOGUE OUTPUT PCB ASSY.
DRAWING NUMBER 400308
SHEET 2 OF 4

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D1	213001	10V 5W ZENER	MOTOROLA	1N5347	2
D2	213001	10V " "	"	"	–
M1 *	260002	OP AMP	FAIRCHILD	µA741C	1 *
M2	260026	OP AMP	NATIONAL	LM212H	1
	400379/4	WIRE / TERMINAL ASSY	HOLDEN CORDS.		5
	410107-3	P.C.B.			1
	450186 -1	SOCKET PLATE.			1
	510000	7/·2 PVC INSUL (BLACK) WIRE			50mm
	510222	7/·2 PVC INSUL (RED) WIRE			50mm
	590001	SLEEVE MAX CABLE ϕ 3·0	HELLERMANN ELECTRIC	H15 x 20mm BLACK HELSYN	2
	605007	5 WAY SOCKET	PVE CONNECTORS	M55	1
J1	605052	8 WAY POLARISED SOCKET	MOLEX	(22-01-2085) 6471-8-1	1

NOTES. * M1 ALTERNATIVE 260025 (LM101).

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TITLE ANALOGUE OUTPUT PCB ASSY
DRAWING NUMBER 400308
SHEET 3 OF 4

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy.
M3		FITTED AT FINAL ASSY.			—
M4		NOT USED			—
M5		NOT USED			—
M6	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503 BCP	1
M7		NOT USED			–
M8	270050	HEX. INVERTER LS	NATIONAL	DM74LS04N	1
M9	280064	GPIA	MOTOROLA	MC68488P	1
M10	280068	DUAL PREC. M'STABLE M'VIBR.	MOTOROLA	MC14538BCP	1
M11	270055	DUAL 4 I/P NAND LS	NATIONAL	DM74 LS20N	2
M12	270055	DUAL 4 I/P NAND LS	NATIONAL	DM74 LS20N	–
M13	270051	DUAL 4 I/P AND LS	NATIONAL	DM74LS21N	1
J1	605102	24 WAY DIL. SOCKET GOLD	CA	CA-24S 105D	1
J2	605002	16 WAY DIL. LOW PROFILE SKT.	JERMYN OR ANTIFERENCE	A23-2001/Y OR ICN-63-S3	1
J3	573120/C	24 WAY AP/3M CABLE ASSY	DATRON		1
J4	605051	4 WAY POLARISED SOCKET	MOLEX	(22-01-2045) 6471-4-1	1
	400379/1	WIRE/TERMINAL ASSY			2
	410165-4A	PCB			1
	540002	22 SWG BTC WIRE			A/R
	590004	SLEEVE - PTFE	HELLERMANN ELECTRIC	FE10	A/R
	605060	14 WAY DIL. SOCKET	ASTRALUX OR JERMYN	ICL-143-S3T	4

NOTES.

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy.
	605061	16 WAY DIL. SOCKET	ASTRALUX OR JERMYN	ICL-163-S6T	2
	605050	40 PIN DIL. LOW PROF. SKT	AUGAT	340-AG39D	1
	605064	24 PIN DIL SOCKET	AUGAT	324-AG39D	3
	605056	CRIMP TERMINAL	MOLEX	4809-TL	2
	606005	CLIP FOR 605002	ANTIFERENCE	RC-74	1
	620007	TEST POINT TERMINAL	MICROVAR	C30	5
	900004	SILICONE RUBBER COMPOUND	RS	555-588	A/R

NOTES.

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DATE	SHEET 5 OF 5

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000104	100k 5% ¼W CARBON	MULLARD	CR25	3
R2	000103	10k 5% ¼W CARBON	MULLARD	CR25	1
R3	000104	100k 5% ¼W CARBON	MULLARD	CR25	–
R4	000104	100k 5% ¼W CARBON	MULLARD	CR25	–
R5	000102	1K 5% ¼W CARBON	MULLARD	CR25	2
R6	000561	560R 5% ¼W CARBON	MULLARD	CR25	1
R7	000102	1k 5% ¼W CARBON	MULLARD	CR25	–
R8	000332	3K3 5% ¼W CARBON	MULLARD	CR25	1
AN1	090017	100k × 7 2% NETWORK	BECKMAN	764-1-R100k	1
C1	150015	10µF 20% 35V DIP. TANT.	UNION CARBIDE	K10E35	3
C2	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	9
C3	150015	10µF 20% 35V DIP. TANT.	UNION CARBIDE	K10E35	–
C4	150015	10µF 20% 35V DIP. TANT.	UNION CARBIDE	K10E35	–
C5	150016	1µF 20% 35V DIP. TANT.	UNION CARBIDE	K1R0E35	1
C6	150012	100nF 20% 35V DIP. TANT	UNION CARBIDE	KR10E35	1
C7	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	–
C8	101103	10nF 25% 250V CER. DISC	ITT	CD10	1
C9	102681	680pF 10% 500V CER DISC	ITT	CD10	1
C10	102101	100pF 10% 500V CER DISC	ITT	CD10	1
C11	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	–
C12	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	–
C13	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	–

NOTES.

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SHEET 2 OF 5

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C14	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	–
C15	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	–
C16	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	–
C17	104025	100nF $^{+80}_{-20}$% 50V CER DISC	SIEMENS	B37449	–
M1	280086	BI-DIRECTIONAL BUS TRANSC'R	MOTOROLA	MC3447P	2
M2	280086	BI-DIRECTIONAL BUS TRANSC'R	MOTOROLA	MC3447P	–

NOTES.

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SHEET 3 OF 5

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
R47	000100	10R 5% 1/4W CARBON	MULLARD	CR25	–
R48	000103	10K " " "	"	"	12
R49	000103	10K " " "	"	"	–
R50	000103	10K " " "	"	"	–
R51	000100	10R " " "	"	"	–
R52	000334	330K " " "	"	"	4
R53	000334	330K " " "	"	"	–
R54	000334	330K " " "	"	"	–
R55	000334	330K " " "	"	"	–
R56	000104	100K " " "	"	"	–
R57	000161	160R " " "	"	"	–
R58	000161	160R " " "	"	"	–
R59	000224	220K " " "	"	"	5
R60	000223	22K " " "	"	"	2
R61	000105	1M 10% 1/4W CARBON	"	"	–
R62	000105	1M " " "	"	"	–
R63	000122	1K2 5% 1/4W CARBON	"	"	–
R64		NOT USED			–
R65	000101	100R 5% 1/4W CARBON	MULLARD	CR25	–
R66	012212	22k1 1% 1/8W 50ppm MF	HOLCO	H8C	4
R67	000562	5K6 5% 1/4W CARBON	MULLARD	CR25	2
R68	070163	150k 0·1% 10ppm WW	MANN	MX125	2
R69	070066	10k ·1% 5ppm WW	MANN	MX125B	2

NOTES.

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SHEET 4 OF 24

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R70	070066	10k 0·1% 10ppm WW	MANN	MX125B	–
R71	070163	150k 0·1% 10ppm WW	"	MX125	–
R72	000472	4K7 5% 1/4W CARBON	MULLARD	CR25	–
R73	000103	10K " " "	"	"	–
R74	000275	2M7 " " "	"	"	1
R75	000565	5M6 " " "	"	"	1
R76	000106	10M 10% 1/4W CARBON.	"	"	2
R77	000226	22M " " "	"	"	2
R78	000473	47K 5% 1/4W CARBON	"	"	–
R79	000392	3K9 " " "	"	"	2
R80	000104	100K " " "	"	"	–
R81	000682	6k8 " " "	"	"	–
R82	000682	6k8 " " "	"	"	–
R83	013321	3k32 1% 1/8W 50ppm MF	HOLCO	H8C	2
R84	013321	3k32 1% 1/8W 50ppm MF	HOLCO	H8C	–
R85		F.S.V.	MULLARD	CR25	–
R86		NOT USED			–
R87		NOT USED			–
R88		NOT USED			–
R89		NOT USED			–
R90	219020-1				–
R91	070165	150k ·1% 3ppm WW	MANN	AX175C	1
R92		NOT USED			–

NOTES.

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SHEET 5 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000104	100k 5% ¼W CARBON	MULLARD	CR25	10
R2	000101	100R " " "	"	"	8
R3	000101	100R " " "	"	"	–
R4	000156	15M 10% " "	ALLEN BRADLEY	CB	1
R5		F.S.V. (18k NOM)		CR25	–
R6	050057	27k4 1% 15ppm MF	HOLCO	H8	2
R7	050057	27k4 " " "	HOLCO	H8	–
R8	000101	100R 5% ¼W CARBON	MULLARD	CR25	–
R9		NOT USED			–
R10	000101	100R 5% ¼W CARBON	"	"	–
R11		FSV		CR25	–
R12	014751	4k75 1% ⅛W 50ppm MF	HOLCO	H8C	2
R13	011003	100k 1% ⅛W 50ppm MF	HOLCO	H8C	3
R14	014751	4k75 1% ⅛W 50ppm MF	HOLCO	H8C	–
R15		FSV			–
R16	019091	9k09 1% ⅛W 50ppm MF	HOLCO	H8C	1
R17	000272	2k7 5% ¼W CARBON	MULLARD	CR25	3
R18	000101	100R 5% ¼W CARBON	MULLARD	CR25	–
R19	000331	330R 5% ¼W CARBON	MULLARD	CR25	1
R20	063203	20K POT CERMET	BECKMAN	72P	1
R21	000105	1M 5% ¼W CARBON	MULLARD	CR25	11
R22	000101	100R " " "	"	"	–
R23	063504	500k POT CERMET	BECKMAN	72P	1

NOTES. CIRCUIT DIAG. = 430503
CHECK PROCEDURE = 460503
CHECK LIST = 470503
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SHEET 2 OF 24

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R24	000184	180k 10% ¼W CARBON	MULLARD	CR25	1
R25	000122	1K2 5% ¼W CARBON	MULLARD	CR25	2
R26	000185	1M8 10% ¼W CARBON	"	"	1
R27	000475	4M7 " " "	"	"	1
R28	000222	2k2 5% ¼W CARBON	"	"	4
R29	000100	10R " " "	"	"	7
R30	000100	10R " " "	"	"	–
R31	014752	47k5 1% ⅛W 50ppm MF	HOLCO	H8C	2
R32	013922	39k2 1% ⅛W 50ppm MF	HOLCO	H8C	1
R33	014752	47k2 1% ⅛W 50ppm MF	HOLCO	H8C	–
R34	000102	1K 5% ⅛W 50ppm MF	MULLARD	CR25	–
R35	011003	100k 1% ⅛W 50ppm MF	HOLCO	H8C	–
R36	011003	100k 1% ⅛W 50ppm MF	HOLCO	H8C	–
R37	000682	6k8 5% ¼W CARBON	MULLARD	CR25	6
R38		NOT USED			–
R39	090012-2	9k10 ·02% R 2ppm R WW	MANN	AX175BT	1
R40	090012-2	9k10 ·02% R 2ppm R WW	MANN	AX175BT	–
R41	000332	3k3 5% ¼W CARBON	MULLARD	CR25	2
R42	000473	47k 5% ¼W CARBON	MULLARD	CR25	5
R43	070164	5k ·1% 3ppm WW	MANN	AX175C	1
R44	090110-1	5k ATTN SET	VISHAY	SEE DRG	1 SET
R45	090110-1	5k ATTN SET	VISHAY	SEE DRG	–
46	000182	1K8 5% ¼W CARBON	MULLARD	CR25	1

NOTES.

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SHEET 3 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R139	041004	1M00 1% ½W 100ppm CF	ALLEN BRADLEY	CC	–
R140	012742	27k4 1% ⅛W 50ppm MF	HOLCO	H8C	2
R141	012742	27k4 1% ⅛W 50ppm MF	HOLCO	H8C	–
R142	000272	2K7 5% ¼W CARBON	MULLARD	CR25	–
R143	090106-1	3M3 10M INPUT ATTEN. SET	MANN (VISHAY 090112)		1 SET
R144	000100	10R 5% ¼W CARBON	MULLARD	CR25	–
R145	000103	10k " " "	"	"	–
R146	000222	2K2 " " "	"	"	–
R147	000123	12K " " "	"	"	1
R148	090106-1	100K 10M INPUT ATTEN. SET.	MANN (VISHAY 090112)		–
R149	090106-1	3M3 " " " "	"		–
R150		NOT USED			–
R151		NOT USED			–
R152	000224	220k 5% ¼W CARBON	MULLARD	CR25	–
R153	000225	2M2 5% ¼W CARBON	MULLARD	CR25	1
R154	000103	10K 5% ¼W CARBON	MULLARD	CR25	–
R155	000221	220R " " "	"	"	1
R156	090106-1	3M3 10M INPUT ATTEN. SET	MANN (VISHAY 090112)		–
R157	000103	10K 5% ¼W CARBON	MULLARD	CR25	–
R158	000332	3K3 " " "	"	"	–
R159	063104	100k POT CERMET	BECKMAN	72P	1
R160	063202	2k " "	"	"	1
R161	000272	2k7 5% ¼W CARBON	MULLARD	CR25	–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R162	000392	3K9 5% ¼W CARBON	MULLARD	CR25	–
R163	000107	100M 10% ¼W CARBON	ALLEN- BRADLEY	CB	1
R164	000104	100k 5% ¼W CARBON	MULLARD	CR25	–
R165	000104	100k 5% " "	"	"	–
R166	000563	56K 5% " "	"	"	5
R167	000562	5K6 " " "	"	"	–
R168	000563	56K " " "	"	"	–
R169	000563	56K " " "	"	"	–
R170	000564	560K " " "	"	"	2
R171	000564	560K " " "	"	"	–
R172	000335	3M3 10% ¼W CARBON	MULLARD	CR25	1
R173	000680	68R 5% " "	"	"	2
R174	000152	1K5 " " "	"	"	2
R175	000822	8K2 " " "	"	"	2
R176	000680	68R " " "	"	"	–
R177	000152	1K5 " " "	"	"	–
R178	000822	8K2 " " "	"	"	–
R179	440066-1	PART OF KIT	DATRON.		1
R180	440066-1	" " "	"		–
R181	440066-1	" " "	"		–
R182	000472	4K7 5% ¼W CARBON	MULLARD	CR 25	–
R183	000472	4K7 5% " "	"	"	–
R184	000270	27R " " "	"	"	2

NOTES.

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TITLE 1081 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400503 9

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R231	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R232	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R233	000226	22M 5% ¼W CARBON	MULLARD	CR25	—
R234		NOT USED			—
R235		NOT USED			—
R236		NOT USED			—
R237		NOT USED			—
R238	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R239	000102	1k 5% ¼W CARBON	MULLARD	CR25	—
AN1.	090050	3K3 S.I.P NETWORK	BECKMAN	764-1-R3·3K	1
AN2.	090042-1	R-2R LADDER NETWORK	ERIE		1
C1	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	13
C2	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C3	110005	10nF 20% 250V POLYESTER	MULLARD	C280AE P10K	2

NOTES.

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C4	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C5	101103	10nF 25% 250V CER DISC	ITT	CD10	6
C6	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C7	150020	10μF " " " "	" "	"	—
C8		NOT USED			—
C9 *	140037-3	2μF SEL LOW D.A. GREEN	DATRON (Mkg)		1
C10	110040	33nF 20% 63V POLYESTER	WIMA	MKS2	1
C11	110027	3300pF 20% 100V POLYESTER.	WIMA	FKS2-MIN	2
C12	120031	3μ3F 10% 63V POLYCARB	ASHCROFT	A2633213	1
C13	102101	100pF 500V CER DISC	ERIE	801	3
C14	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C15	150020	10μF " " " "	" "	"	—
C16	102101	100pF 500V CER DISC	ERIE	801	—
C17	102100	10pF " " "	"	"	1
C18	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C19	150020	10μF " " " "	" "	"	—
C20	102470	47pF 500V CER DISC	ERIE	801	4
C21	102470	47pF 500V CER DISC		"	—
C22	102101	100pF 500V CER DISC	"	"	—
C23	101103	0·01μF 250V CER DISC	"	"	—
C24	101103	0·0μF 250V CER DISC	"	"	—
C25	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C26	102471	470pF 500v CER DISC	ITT	CD10	2

NOTES * ALTERNATIVE 140050-3 2μF SEL LOW DA BLUE

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R93	000124	120K 5% 1/4W CARBON	MULLARD	CR25	2
R94	000102	1K " " "	"	"	–
R95	000106	10M 10% " "	"	"	–
R96	011473	147K 1% 50ppm MF	HOLCO	H8	1
R97		NOT USED			–
R98		NOT USED			–
R99	000 682	6k8 5% 1/4W CARBON	MULLARD.	CR25.	–
R100	000 682	6k8 " " "	"	"	–
R101	000 271	270R 5% 1/4W CARBON	MULLARD	CR25	4
R102	000 271	270R " " "	"	"	–
R103	000271	270R " " "	"	"	–
R104	000151	150R " " "	"	"	1
R105	000271	270R " " "	"	"	–
R106	000100	10R " " "	"	"	–
R107	000100	10R " " "	"	"	–
R108	090114-1	10K8114 ATTEN. SET	VISHAY		1 SET
R109	090114-1	10K8114 " "	"		–
R110	090114-1	9K " "	"		–
R111	090114-1	1k " "			–
R112	000682	6K8 5% 1/4W CARBON	MULLARD	CR25	–
R113	000105	1M 10% 1/4W CARBON	"	"	–
R114	042214	2M21 1% 100ppm CERMET FILM	ALLEN BRADLEY	TYPE CC	1
R115	041004	1M 1% 100ppm CERMET FILM	"	"	2

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R116	000105	1M 5% 1/4W CARBON	MULLARD	CR25	–
R117	000105	1M " " "	"	"	–
R118	000105	1M " " "	"	"	–
R119	008012	27K 2W CARBON FILM	PIHER	"	2
R120	008012	27K " " "	"	"	–
R121	008011	22K " " "	"	"	2
R122	008011	22K " " "	"	"	–
R123	000473	47k 5% 1/4W CARBON	MULLARD	"	–
R124	000473	47k 5% 1/4W CARBON	MULLARD	"	–
R125	000473	47k 5% 1/4W CARBON	MULLARD	"	–
R126	000104	100k 5% 1/4W CARBON	MULLARD	"	–
R127		NOT USED			–
R128	011001	1k0 1% 1/8W 50ppm MF	HOLCO	H8C	1
R129	090111 -	100M 5% THICK FILM	HOLSWORTHY	SEE DRG	2
R130	000362	3K6 5% 1/4W CARBON	MULLARD	CR25	2
R131	000362	3K6 " " "	"	"	–
R132	000105	1M " " "	"	"	–
R133	000105	1M " " "	"	"	–
R134	090111-	100M 5%	HOLCO	TFR2VE	–
R135	014643	464k 1%	HOLCO.	H8	1
R136	041005	10M 1% 1/2W 100ppm CF	ALLEN BRADLEY	CC	1
R137	043324	3M32 1% 1/2W 100ppm CF	ALLEN BRADLEY	CC	1
R138	000104	100k 5% 1/4W CARBON	MULLARD	CR25	–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D7	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D8	210082	C8V2 400mW ZENER	MULLARD	BZY88C	1
D9	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D10	200008	" " "	"	"	–
D11	200008	" " "	"	"	–
D12	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D13	200001	" " "	"	"	–
D14	200001	" " "	"	"	–
D15	200001	" " "	"	"	–
D16	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D17	200008	" "	"	"	–
D18	210068	C6V8 400mW ZENER	MULLARD	BZY88C	4
D19	210068	" " "	"	"	–
D20	210068	" " "	"	"	–
D21	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D22	210220	C22V 400mW ZENER	MULLARD	BZY88C	2
D23	210220	" " "	"	"	–
D24	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D25	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D26	200008	" " "	"	"	–
D27	200008	" " "	"	"	–
D28	200008	" " "	"	"	–
D29	200008	" " "	"	"	–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D30	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D31	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D32	200001	" " "	"	"	–
D33	200001	" " "	"	"	–
D34	200001	" " "	"	"	–
D35	210047	C4V7 400mW ZENER	MULLARD	BZY88C4V7	2
D36	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D37	200008	" " "	"	"	–
D38	200008	" " "	"	"	–
D39	210068	6V8 400mW ZENER	MULLARD	BZY88C6V8	–
D40	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D41	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D42	200001	" " "	"	"	–
D43	200002	Si RECTIFIER 1A.50V.	MOTOROLA	1N4001	4
D44	200002	" " " "	"	"	–
D45	200002	" " " "	"	"	–
D46	200002	" " " "	"	"	–
D47		NOT USED			–
D48	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D49	210200	C20V 400mW ZENER	MULLARD	BZY88C	2
D50	210100	C10V 400mW ZENER	MULLARD	BZY88C	2
D51	210100	" " "	"	"	
D52	210200	C20V 400mW ZENER	MULLARD	BZY88C	–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R185	000270	27R 5% 1/4W CARBON	MULLARD	CR25	–
R186	000104	100K " " "	"	"	–
R187	000222	2K2 " " "	"	"	–
R188	000103	10K " " "	"	"	–
R189	000103	10K " " "	"	"	–
R190	000561	560R " " "	"	"	2
R191	000561	560R " " "	"	"	–
R192	000155	1M5 " " "	"	"	1
R193	000273	27K " " "	"	"	1
R194	011213	121K 1% 1/8W M.F.	HOLCO	H8	1
R195	015112	51K1 " " "	"	"	1
R196	000223	22K 5% 1/4W CARBON	MULLARD	CR25	–
R197	000222	2K2 " " "	"	"	–
R198	000181	180R " " "	"	"	1
R199	008007	10R 5% 0.2W CARBON	MULLARD	CR16	2
R200	008007	10R " " "	"	"	–
R201	000823	82k 5% 1/4W CARBON	MULLARD	CR25	1
R202	000103	10K " " "	"	"	–
R203	000104	100K " " "	"	"	–
R204	000105	1M " " "	"	"	–
R205	000105	1M " " "	"	"	–
R206	000563	56K " " "	"	"	–
R207	000103	10K " " "	"	"	–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R208	000333	33K 5% 1/4W CARBON	MULLARD	CR25	1
R209	000563	56K " " "	"	"	–
R210	000103	10K " " "	"	"	–
R211	219020-1				–
R212	219020-1				–
R213	219020-1				–
R214	219020-1				–
R215	219020-1				–
R216	219020-1				–
R217		NOT USED			–
R218	000102	1k 5% 1/4W CARBON	MULLARD	CR25	–
R219	000224	220K 5% 1/4W CARBON	MULLARD	CR25	–
R220	000124	120K " " "	"	"	–
R221	000224	220K " " "	"	"	–
R222	000224	220K " " "	"	"	–
R223					
R224	012212	22k1 1% 1/8W 50ppm MF	HOLCO	H8C	–
R225	012212	22k1 1% 1/8W 50ppm MF	HOLCO	H8C	–
R226	012212	22k1 1% 1/8W CARBON	HOLCO	H8C	–
R227	000471	470R 5% 1/4W CARBON	MULLARD	CR25	1
R228		NOT USED			–
R229		NOT USED			–
R230		NOT USED			–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q24	240014	Si NPN	FAIRCHILD	BC337	2
Q25	250011	Si PNP	"	BC327	2
Q26	250011	Si PNP	"	"	–
Q27	250001	Si PNP	"	BC214	4
Q28	240014	Si NPN	"	BC337	–
Q29	240001	Si NPN	"	BC184	6
Q30	240006	Si NPN	"	2N3904	–
Q31	250004	Si PNP	"	2N3906	1
Q32	240001	Si NPN	"	BC184	–
Q33	240001	Si NPN	"	BC184	–
Q34	250001	Si PNP	"	BC214	–
Q35	230031	LOW LEAKAGE DUAL FET	TELEDYNE	SU2656 M	–
Q36	230031	" " " "	"	"	–
Q37	230031	" " " "	"	"	–
Q38	230055	N-CHAN I LIM 430µA	"	TCR502	1
Q39	240001	Si NPN	FAIRCHILD	BC184	–
Q40	240001	Si NPN	"	"	–
Q41	250001	Si PNP	"	BC214	–
Q42	240001	Si NPN	"	BC184	–
Q43	250001	Si PNP	"	BC214	–
Q44	230047	N-CHAN I LIM 5·3mA	TELEDYNE	TCR513	2
Q45	230047	" " "	"	"	–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M1 *	220030	Hi SPEED OPTO SELECTED	DATRON	HP4351 (RED)	2
M2	220017-2	DUAL OPTO ISOLATOR	FAIRCHILD	FCD880	6
M3		NOT USED			–
M4	220029	Hi SPEED OPTO SELECTED	DATRON	HP4351 (WHITE)	2
M5	220029	" " " "	" "	" "	–
M6 *	220030	" " " "	" "	" (RED)	–
M7	220023-2	50 CTR DUAL OPTO ISOLATOR	FAIRCHILD	FCD880/50 CTR	1
M8	220017-2	" " "	"	"	–
M9	220017-2	" " "	"	"	–
M10	220017-2	" " "	"	"	–
M11	220017-2	" " "	"	"	–
M12	280075	DUAL 4 I/P NAND	MOTOROLA	MC14012 BCP	1
M13	280015	QUAD LATCH	MOTOROLA	MC14076 BCP	4
M14	280015	" "		"	–
M15	260029	VOLTAGE COMPARATOR	NATIONAL	LM311 HC	1
M16	280082	HEX INVERTER	FAIRCHILD	F40014 BPC	1
M17	280079	QUAD 2 I/P OR GATE	MOTOROLA	MC14071 BCP	1
M18	280008	QUAD 2 I/P NAND GATE	"	MC14011 BCP	3
M19	280008	" " " " "	"	"	–
M20	280015	QUAD LATCH	"	MC14076 BCP	–
M21	280015	" "	"	"	–
M22	260065	OP27 OP AMP	PMI	OP27FZ	1
M23		NOT USED			–

NOTES *ALTERNATIVE HP4351 (220018)

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C27	130073	InF 5% 160V POLYSTYRENE	SUFLEX	HSC100/5-10/160	2
C28	101103	10nF 25% 250V CER DISC	ITT	CD10	–
C29	101103	10nF 25% 250V CER DISC	ITT	CD10	–
C30	110005	10nF 20% 250V POLYESTER	MULLARD	C280AE P10k	–
C31	130073	InF 5% 160V POLYSTYRENE	SUFLEX	HSC1000/5-10/160	–
C32	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	1
C33	110013	0·1µF 10% 250V POLYESTER	MULLARD	C280AE/P100K	7
C34	110035	220nF 20% 63V POLYESTER	WIMA	MKS2	1
C35	120016	2n2F 20% 100V POLYCARB.	WIMA	FKC2MIN.	1
C36		NOT USED			—
C37	110013	0·1µF 10% 250V POLYESTER	MULLARD	C280 AE/P100K	–
C38	102102	InF 10% 500V CER DISC	ITT	CD10	2
C39	440066	PART OF KIT	DATRON		–
C40	440066	PART OF KIT.	DATRON		1
C41	440066.	" " "	"		–
C42	110013	0·1µF 10% 250V POLYESTER	MULLARD	C280AE/P100K	–
C43	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	–
C44	150020	10µF " " " "		"	–
C45	180006	47µF 25V AL.ELECT	MULLARD	016-16479	2
C46	180006	47µF 25V "	"	"	–
C47	180022	33µF 40V "	"	016-17339	2
C48	180022	33µF 40V		"	–
C49	180024	10µF 63V AL.ELECT	MULLARD	016-18109	2

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C50	180024	10µF 63V AL.ELECT	MULLARD	016-18109	–
C51	101103	10nF 250V CER DISC	ERIE	801	–
C52	110017	0·022µF 10% 250V POLYESTER	MULLARD	C280AE/P22K	1
C53	102332	3n3F 500V CER DISC	ERIE	801	2
C54	102332	3n3F 500V " "	"	"	–
C55	440066	PART OF KIT	DATRON.		–
C56	150016	1µF 20% 35V DIP TANT	UNION CARBIDE	K1R0E35	1
C57	130064	220pF 2½% 160V POLYSTYRENE	SUFLEX	HS220/2½-7/160	1
C58	110027	3300pF 20% 100V POLYESTER	WIMA	FKS 2-MIN	1
C59	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	–
C60	102222	2n2F 500V CER DISC	ERIE	801	1
C61		NOT USED			–
C62	110013	100nF 20% 250V POLYESTER	MULLARD	C280AE P100k	–
C63	110013	100nF 20% 250V POLYESTER	MULLARD	C280AE P100k	–
C64	102102	InF 10% 500V CER DISC	ITT	CD10	–
C65	110013	100nF 20% 250V POLYESTER	MULLARD	C280AE P100k	–
C66	110013	100nF 20% 250V POLYESTER	MULLARD	C280AE P100k	–
D1	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	22
D2	210056	C5V6 400mW ZENER	MULLARD	BZY 88C5V6	2
D3	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	–
D4	210056	C5V6 400mW ZENER	MULLARD	BZY 88C5V6	–
D5	200001	Si GEN. PURPOSE	FAIRCHILD	IN4148	22
D6	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	–

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
53	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A.	–
D54	200008	" " "	"	"	–
D55	200001	Si GEN PURPOSE	"	IN4148	–
D56	200001	" " "	"	"	–
D57		NOT USED			–
D58		NOT USED			–
D59	219020-1	ZENER REFERENCE SET			–
D60	219020-1	" " "			–
D61	219020-1	" " "			–
D62	219020-1	" " "			–
D63	200001	Si GEN PURPOSE	FAIRCHILD-	IN4148	–
D64		NOT USED			–
D65		NOT USED			–
D66	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	–
D67	200008	" " "	"	"	–
D68	200001	Si GEN PURPOSE	"	IN4148	–
D69	200001	Si GEN PURPOSE	"	IN4148	–
D70	200001	Si GEN PURPOSE	"	IN4148	–
D71	210047	4V7 400mW ZENER	MULLARD	BZY88C4V7	–
D72	200001	Si GEN PURPOSE	FAIRCHILD	IN4148	–

NOTES

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TITLE 1081 ANALOGUE PCB ASSEMBLY
DRAWING NUMBER 400503
SHEET [illegible]

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
Q1	230001	N CHAN CURRENT LIM	SILICONIX	E506	2
Q2	250008	Si P.N.P	FAIRCHILD	BC214C	2
Q3	250008	Si P.N.P	FAIRCHILD	BC 214 C	–
Q4	230001	N CHAN CURRENT LIM	SILICONIX	E506	–
Q5	230027-1	LOW LEAKAGE N-FET	TELEDYNE	U3114	7
Q6	230027-1	"	"	"	–
Q7	230027-1	"	"	"	–
Q8	230027-1	"	"	"	–
Q9	230027-1	"	"	"	–
Q10	230027-1	"	"	"	–
Q11	230027-1	"	"	"	–
Q12	230031	N-CHAN DUAL JFET	"	SU2656M	4
Q13	230002	N-CHAN J-FET	TELEDYNE	U1994E	6
Q14	230002	" "	"	"	–
Q15	230002	" "	"	"	–
Q16	230002	" "	"	"	–
Q17		NOT USED			–
Q18	230002	N-CHAN J-FET	TELEDYNE	U1994E	–
Q19	230002	" "	"	"	–
Q20	240006	Si NPN	FAIRCHILD	2N3904	5
[illegible]	240006	" "	"	"	–
[illegible]	240006	" "	"	"	–
Q23	240006	" "	"	"	–

NOTES

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TITLE 1081 ANALOGUE PCB ASSEMBLY
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SHEET 19 OF 24

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	611004	SCREW M3 x 6mm POZI-PAN	GKN	ZINC PLATED	3
	613005	WASHER M3 INT/SHAKEPROOF ST	GKN	" "	1
	615002	NUT M3 FULL HEX STEEL		" "	1
	617010	NYLATCH PLUNGER HN3P	RICHCO	HN3P-32-4-1	7
	617011	" GROMMET HN3G	"	HN3G-32-1	7
	620005	CLOVERLEAF P.T.F.E. TERM.	SEALECTRO	FTE15 P20	8
	620007	TEST POINT TERMINAL	MICROVAR	C30	30
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	5
	630036	STANDARD STEATITE INSUL. BEAD	PARK ROYAL PORCELAIN CO	TYPE N°1 (18 SWG)	8
	615005	NUT 3-48 UNC FULL HEX STEEL.			1
	613014	WASHER M2·5 INT/SHAKEPROOF	GKN DISTRIBUTORS.	ZINC PLATED	1
	613029	M3 CRINKLE WASHER SS			2
	450383-1	DIODE HEATSINK BLOCK			2
	900003	HEATSINK COMPONENT	RS	554-311	A/R

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J.W. 1384

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R47	012743	274k 1% 1/8W 50ppm MF	HOLCO	H8C	–
R48	041004	1M 1% 1/2W 100ppm CF	ALLEN BRADLEY	CC	2
R49	011002	10k0 1% 1/8W 50ppm M/F	HOLCO	H8C	2
R50	063104	100k POT 3/8 SQ. CERMET	BECKMAN	72P	2
R51	090111-	100M 5% THICK FILM	HOLSWORTHY	SEE DRG	–
R52	080049-1	25k ·1% 3ppm M.FOIL	VISHAY	SEE DRG	1
R53	080039	3k0 ·1% 10ppm M.FOIL	VISHAY	VSRC1	1
R54	080040	1k5 ·1% 10ppm M.FOIL	VISHAY	VSRC1	1
R55	080041	750R ·1% 50ppm M.FOIL	VISHAY	VSRC1	1
R56	080042	375R ·1% 50ppm M. FOIL	VISHAY	VSRC1	1
R57	000182	1k8 5% 1/4W CARBON	MULLARD	CR25	4
R58	000151	150R 5% 1/4W CARBON	MULLARD	CR25	1
R59	000752	7k5 5% 1/4W CARBON	MULLARD	CR25	3
R60	000478	4R7 5% 1/4W CARBON	MULLARD	CR25	1
R61	063200	20R POT 3/8 SQ. CERMET	BECKMAN	72P	1
R62	063100	10R POT 3/8 SQ. CERMET	BECKMAN	72P	1
R63	000100	10R 5% 1/4W CARBON	MULLARD	CR25	3
R64	012003	200k 1% 1/8W 50ppm MF	HOLCO	H8C	1
R65	000124	120k 5% 1/4W CARBON	MULLARD	CR25	1
R66	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	4
R67	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	–
R68	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	–
R69	000103	10k 5% 1/4W CARBON	MULLARD	CR25	–

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1081 AC PCB ASSY

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R70	080045-1	5k5 ·01% 3ppm M.FOIL	VISHAY	SEE DRG	–
R71	000331	330R 5% 1/4W CARBON	MULLARD	CR25	–
R72	000680	68R 5% 1/4W CARBON	MULLARD	CR25	–
R73	000562	5k6 5% 1/4W CARBON	MULLARD	CR25	–
R74	080045-1	5k5 ·01% 3ppm M.FOIL	VISHAY	SEE DRG	–
R75	080044-1	4k9925 ·01% 3ppm M.FOIL	VISHAY	SEE DRG	1
R76	014991	4k99 1% 1/8W 50ppm MF	HOLCO	H8C	1
R77	090111	100M 5% THICK FILM	HOLSWORTHY	SEE DRG	–
R78	000182	1k8 5% 1/4W CARBON	MULLARD	CR25	–
R79	000752	7k5 5% 1/4W CARBON	MULLARD	CR25	–
R80	000471	470R 5% 1/4W CARBON	MULLARD	CR25	1
R81	000105	1M 5% 1/4W CARBON	MULLARD	CR25	–
R82	000475	4M7 5% 1/4W CARBON	MULLARD	CR25	1
R83	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	–
R84	000103	10k 5% 1/4W CARBON	MULLARD	CR25	–
R85	000105	1M 5% 1/4W CARBON	MULLARD	CR25	–
R86	013323	332k 1% 1/8W 50ppm MF	HOLCO	H8C	1
R87	011503	150k 1% 1/8W 50ppm MF	HOLCO	H8C	1
R88	000105	1M 5% 1/4W CARBON	MULLARD	CR25	–
R89	000104	100k 5% 1/4W CARBON	MULLARD	CR25	–
R90	000182	1k8 5% 1/4W CARBON	MULLARD	CR25	–
R91	000101	100R 5% 1/4W CARBON	MULLARD	CR25	–
R92	000221	220R 5% 1/4W CARBON	MULLARD	CR25	–

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M24	220017 - 2	DUAL OPTO ISOLATOR	FAIRCHILD	FCD880	–
M25	260022	LINEAR IC OP AMP	NATIONAL	LF 355	2
M26	290078	4016 SWITCH SELECTED	DATRON	MC14016BCL (WHITE)	1
M27	280008	QUAD 2 I/P NAND GATE	"	MC14011 BCP	–
M28	280044	BINARY UP/DOWN COUNTER	"	MC14516 BCP	1
M29	280011	DUAL D FLIP-FLOP	"	MC14013 BCP	1
M30	260053	7650 OP AMP	INTERSIL	ICL 7650 CPD	1
M31	260067	11 OP AMP	NATIONAL	LM11CLH	1
M32	260066	11 OP AMP	NATIONAL	LM11CN	1
M33	260002	" " " "	FAIRCHILD	μA 741 HC	2
M34	260013	" " " "	NATIONAL	LF 356	1
M35	290081	4051 MUX SELECTED	DATRON	M14051 BCL (WHITE)	1
M36	260002	741 OP AMP	FAIRCHILD	μA741HC	–
M37	NOT USED				–
M38	NOT USED				–
M39	260027	714 OP AMP	FAIRCHILD	μA714HC	2
M40	260027	714 OP AMP	FAIRCHILD	μA714 HC	–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
RL1	330018 - 1	RELAY 2P2W 7V HOLD-IN	AMF	SEE DRAWING	1
RL2	330027 - A	RELAY 1P2W MINIATURE	TAKAMISAWA	MZ12HSC	1
	400379/1	WIRE/TERMINAL ASSY			7
	400379/2	" " "			4
	410216 - 1	P.C.B.			1
	459112 - 2	RELAY BRACKET	KDP		1
	540002	22 SWG. TINNED COPPER WIRE			A/R
	540008	7/·2 PTFE INSULATED WHITE WIRE.			165mm
	590001	SLEEVE. MAX CABLE ø 3·0	HELLERMANN ELECTRIC	H15 x 20mm BLK HELSYN	5
J 3	571075/C	16 WAY AP/3M RIBBON CABLE	DATRON		1
	602001	F.S.V. TERMINAL	MOLEX	02-04-1875	8
J2, 4, 5	605002	16 WAY DIL SOCKET	JERMYN	A23-2001/Y	3
	605060	14 WAY DIL SOCKET	ASTRALUX	ICL 143 - S3T	8
	605061	16 WAY DIL SOCKET	ASTRALUX	ICL 143 - S6T	11
J1 & J6	605052	8 WAY POLARISED SOCKET	MOLEX	22-01-2085	2
	605059	8 WAY DIL SOCKET	ASTRALUX	ICL-083-S6T	6
	606005	CLIP FOR 605002	ANTIFERENCE	RC-74	2

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R139	011822	18k2 1% 1/8W 50ppm MF	HOLCO	H8C	2
R140	014321	4k32 1% 1/8W 50ppm MF	HOLCO	H8C	1
R141	041824	1M82 1% 1/2W 100ppm MF	HOLCO	H8C	1
R142	080043-1	1k ·1% 3 ppm M.FOIL	VISHAY	SEE DRG	—
R143	080048-1	10k1 ·1% 3 ppm M.FOIL	VISHAY	SEE DRG	1
R144	080051-1	111k ·1% 3 ppm M.FOIL	VISHAY	SEE DRG	1
R145		NOT USED			—
R146	080062	1M ·1% 5 ppm M.FILM	VTM	MAR7-T16-1M-0·1%	1
R147	000101	100R 5% 1/4W CARBON	MULLARD	CR25	—
R148	063104	100k POT 3/8 SQ. CERMET	BECKMAN	72P	—
R149	011822	18k2 1% 1/8W 50ppm MF	HOLCO	H8C	—
R150	000100	10R 5% 1/4W CARBON	MULLARD	CR25	—
R151	000100	10R 5% 1/4W CARBON	MULLARD	CR25	—
R152	000104	100k 5% 1/4W CARBON	MULLARD	CR25	—
R153	000104	100k 5% 1/4W CARBON	MULLARD	CR25	—
R154	013320	332R 1% 1/8W 50ppm MF	HOLCO	H8C	1
R155	041004	1M 1% 1/2W 100ppm CF	ALLEN BRADLEY	CC	—
R156	019768	97R6 1% 1/8W 50ppm MF	HOLCO	H8C	1
R157	000105	1M 5% 1/4W CARBON	MULLARD	CR25	—
R158	090111-1	100M 5% THICK FILM	HOLSWORTHY	SEE DRG	—
R159	000241	240R 5% 1/4W CARBON	MULLARD	CR25	1
R160	012001	2k00 1% 1/8W 50ppm MF	HOLCO	H8C	—
R161	000101	100R 5% 1/4W CARBON	MULLARD	CR25	—

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SHEET 8 OF 19

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R162	012151	2k15 1% 1/8W 50ppm MF	HOLCO	H8C	1
R163	000912	9k1 5% 1/4W CARBON	MULLARD	CR25	1
R164	014750	475R 1% 1/8W 50ppm MF	HOLCO	H8C	1
R165	000104	100k 5% 1/4W CARBON	MULLARD	CR25	—
R166	015620	562R 1% 1/8W 50ppm MF	HOLCO	H8C	1
R167	080052-	277k ·1% 3 ppm M.FOIL	VISHAY	SEE DRG	4
R168	080052-	277k ·1% 3 ppm M.FOIL	VISHAY	SEE DRG	—
R169	080052-	277k ·1% 3 ppm M.FOIL	VISHAY	SEE DRG	—
R170	080052-	277k ·1% 3 ppm M.FOIL	VISHAY	SEE DRG	—

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000824	820k 5% 1/4W CARBON	MULLARD	CR25	1
R2	000103	10k 5% 1/4W CARBON	MULLARD	CR25	10
R3	000473	47k 5% 1/4W CARBON	MULLARD	CR25	3
R4	000223	22k 5% 1/4W CARBON	MULLARD	CR25	4
R5	080045-1	5k5 ·01% 3ppm M.FOIL	VISHAY	SEE DRG	4
R6	000223	22k 5% 1/4W CARBON	MULLARD	CR25	–
R7	000473	47k 5% 1/4W CARBON	MULLARD	CR25	–
R8	000154	150k 5% 1/4W CARBON	MULLARD	CR25	1
R9	000103	10k 5% 1/4W CARBON	MULLARD	CR25	–
R10	000333	33k 5% 1/4W CARBON	MULLARD	CR25	3
R11	000105	1M 5% 1/4W CARBON	MULLARD	CR25	6
R12	000103	10k 5% 1/4W CARBON	MULLARD	CR25	–
R13	000155	1M5 5% 1/4W CARBON	MULLARD	CR25	1
R14	000105	1M 5% 1/4W CARBON	MULLARD	CR25	–
R15	000333	33k 5% 1/4W CARBON	MULLARD	CR25	–
R16	000333	33k 5% 1/4W CARBON	MULLARD	CR25	–
R17	000103	10k 5% 1/4W CARBON	MULLARD	CR25	–
R18	011001	1k00 1% 1/8W 50ppm MF	HOLCO	H8C	2
R19	011001	1k00 1% 1/8W 50ppm MF	HOLCO	H8C	–
R20	000223	22k 5% 1/4W CARBON	MULLARD	CR25	–
R21	000102	1k 5% 1/4W CARBON	MULLARD	CR25	3
R22	000473	47k 5% 1/4W CARBON	MULLARD	CR25	–
R23	000101	100R 5% 1/4W CARBON	MULLARD	CR25	6

NOTES CIRCUIT DIAGRAM = 430504
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CHECK LIST = 470504

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R24	000562	5k6 5% 1/4W CARBON	MULLARD	CR25	2
R25	000122	1k2 5% 1/4W CARBON	MULLARD	CR25	1
R26	000102	1k 5% 1/4W CARBON	MULLARD	CR25	–
R27		FSV			1
R28	290026	RMS KIT	DATRON	SEE DRG	1 KIT
R29	000120	12R 5% 1/4W CARBON	MULLARD	CR25	1
R30	090111-1	100M 5% THICK FILM	HOLSWORTHY	SEE DRG	4
R31	000331	330R 5% 1/4W CARBON	MULLARD	CR25	3
R32	012743	274k 1% 1/8W 50ppm MF	HOLCO	H8C	2
R33	011003	100k 1% 1/8W 50ppm MF	HOLCO	H8C	1
R34	290026	RMS KIT	DATRON	SEE DRG	–
R35	000221	220R 5% 1/4W CARBON	MULLARD	CR25	5
R36	000680	68R 5% 1/4W CARBON	MULLARD	CR25	3
R37	000271	270R 5% 1/4W CARBON	MULLARD	CR25	2
R38	000271	270R 5% 1/4W CARBON	MULLARD	CR25	–
R39	000224	220k 5% 1/4W CARBON	MULLARD	CR25	1
R40	000104	100k 5% 1/4W CARBON	MULLARD	CR25	10
R41	000103	10k 5% 1/4W CARBON	MULLARD	CR25	–
R42	000104	100k 5% 1/4W CARBON	MULLARD	CR25	–
R43	000104	100k 5% 1/4W CARBON	MULLARD	CR25	–
R44	042674	2M67 1% 1/2W 100ppm CF	ALLEN BRADLEY	CC	1
R45	016811	6k81 1/8W 50ppm MF	HOLCO	H8C	1
R46	012742	27k4 1% 1/8W 50ppm MF	HOLCO	H8C	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C47	102278	2p7F ± ·5pF 500V CER DISC	ITT	CD10	1
C48	110035	220nF 20% 63V POLYESTER	WIMA	MKS2	2
C49	110035	220nF 20% 63V POLYESTER	WIMA	MKS2	—
C50	102100	10pF 5% 500V CER DISC	ITT	CD10	1
C51	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C52	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C53	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C54	101103	10nF 25% 250V CER DISC	ITT	CD10	—
C55	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C56	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C57	130082	680pF 1% 30V POLYSTYRENE	SUFLEX	HS	—
C58	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C59	102470	47pF 5% 500V CER DISC	ITT	CD10	1
C60	102102	1nF 10% 500V CER DISC	ITT	CD10	—
C61	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C62	140058-	150pF x 2 MATCHED SET	DATRON	SEE DRG	—
C63	101103	10nF 25% 250V CER DISC	ITT	CD10	—
C64	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C65	140057-	10nF ½% 125V SILV. MICA	DATRON	SEE DRG	1
C66	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C67	140056-	1nF ½% 300V GLASS	DATRON	SEE DRG	1
C68	110026	6n8F 20% 100V POLYESTER	WIMA	FKS2	1
C69	140055-	91pF ½% 500V GLASS	DATRON	SEE DRG	1

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					No. USED Per Assy
C70	130025	22pF ± 1pF 160V POLYSTYRENE	SUFLEX	HS	1
C71	102330	33pF 5% 500V CER DISC	ITT	CD10	1
C72	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C73	150001	22µF 20% 16V DIP TANT	UNION CARBIDE	K22E16	1
C74	120024	6µ8F 10% 63V POLYCARB	ASHCROFT	A2B6821B	3
C75	120024	6µ8F 10% 63V POLYCARB	ASHCROFT	A2B6821B	—
C76	120024	6µ8F 10% 63V POLYCARB	ASHCROFT	A2B1031B	—
C77	120001	220nF 10% 1kV POLYCARB	SUFLEX	SN1380	1
C78	140031	13pF 5% 500V GLASS	ELECTROSIL	CYFM10	1
C79	140008	10pF 1kV TRIMMER	JACKSON	TETFER VPC	3
C80	102338	3p3F ± ·5pF 500V CER DISC	ITT	CD08	1
C81	140023	20pF 2% 500V GLASS	ELECTROSIL	CYFM10	2
C82	140008	10pF 1kV TRIMMER	JACKSON	TETFER VPC	—
C83	140039	15pF 5% 500V GLASS	ELECTROSIL	CYFM10	1
C84	140008	10pF 1kV TRIMMER	JACKSON	TETFER VPC	—
C85	140023	20pF 2% 500V GLASS	ELECTROSIL	CYFM10	—
C86	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C87	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C88	150002	10µF 20% 16V DIP TANT	UNION CARBIDE	K10E16	2
C89	150002	10µF 20% 16V DIP TANT	UNION CARBIDE	K10E16	—
C90	101103	10nF 25% 250V CER DISC	ITT	CD10	—
C91	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C92	130074	6·8pF ± 1pF 16V POLYSTYRENE	SUFLEX	HS	1

NOTES.

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TITLE 1081 AC PCB ASSY

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R93	000221	220R 5% ¼W CARBON	MULLARD	CR25	—
R94	011002	10k0 1% ⅛W 50ppm MF	HOLCO	H8C	—
R95	000272	2k7 5% ¼W CARBON	MULLARD	CR25	2
R96	000272	2k7 5% ¼W CARBON	MULLARD	CR25	—
R97	080047-1	10k ·01% 3ppm M. FOIL	VISHAY	SEE DRG	1
R98	080045-1	5k5 ·01% 3ppm M. FOIL	VISHAY	SEE DRG	—
R99	000101	100R 5% ¼W CARBON	MULLARD	CR25	—
R100	000335	3M3 5% ¼W CARBON	MULLARD	CR25	1
R101	063105	1M POT ⅜ SQ CERMET	BECKMAN	72P	1
R102	000225	2M2 5% ¼W CARBON	MULLARD	CR25	1
R103	012001	2k00 1% ⅛W 50ppm MF	HOLCO	H8C	4
R104	012001	2k00 1% ⅛W 50ppm	HOLCO	H8C	—
R105	000221	220R 5% ¼W CARBON	MULLARD	CR25	—
R106	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R107	013923	392k 1% ⅛W 50ppm MF	HOLCO	H8C	2
R108	013923	392k 1% ⅛W 50ppm MF	HOLCO	H8C	—
R109	000472	4k7 5% ¼W CARBON	MULLARD	CR25	1
R110	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R111	000223	22k 5% ¼W CARBON	MULLARD	CR25	—
R112	011053	105k 1% ⅛W 50ppm MF	HOLCO	H8C	2
R113	011053	105k 1% ⅛W 50ppm MF	HOLCO	H8C	—
R114	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R115	000222	2k2 5% ¼W CARBON	MULLARD	CR25	1

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TITLE 1081 AC PCB ASSY
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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R116	000752	7k5 5% ¼W CARBON	MULLARD	CR25	—
R117	000680	68R 5% ¼W CARBON	MULLARD	CR25	—
R118	000221	220R 5% ¼W CARBON	MULLARD	CR25	—
R119	063204	200k POT ⅜ SQ. CERMET	BECKMAN	72P.	1
R120	000274	270k 5% ¼W CARBON	MULLARD	CR25	1
R121	080043-1	1k ·1% 3ppm M. FOIL	VISHAY	SEE DRG	2
R122	080046-1	9k ·1% 3ppm M. FOIL	VISHAY	SEE DRG	1
R123	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R124	048253	825k 1% ½W 100ppm CF	ALLEN BRADLEY	CC	1
R125	012001	2k00 1% ⅛W 50ppm MF	HOLCO	H8C	1
R126	000102	1k 5% ¼W CARBON	MULLARD	CR25	—
R127	000682	6k8 5% ¼W CARBON	MULLARD	CR25	1
R128	000101	100R 5% ¼W CARBON	MULLARD	CR25	—
R129	000331	330R 5% ¼W CARBON	MULLARD	CR25	—
R130	000182	1k8 5% ¼W CARBON	MULLARD	CR25	—
R131	080050-1	62k6 ·1% 3ppm M. FOIL	VISHAY	SEE DRG	2
R132	080050-1	62k6 ·1% 3ppm M. FOIL	VISHAY	SEE DRG	—
R133	000330	33R 5% ¼W CARBON	MULLARD	CR25	1
R134	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R135	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R136	018251	8k25 1% ⅛W 50ppm MF	HOLCO	H8C	1
R137	018252	82k5 1% ⅛W 50ppm MF	HOLCO	H8C	1
R138	011823	182k 1% ⅛W 50ppm MF	HOLCO	H8C	1

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C1	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	9
C2	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C3	102101	100pF 10% 500V CER DISC	ITT	CD10	3
C4	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	25
C5	120018	1µ5F 10% 63V POLYCARB	ASHCROFT	A2B1521B	2
C6	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C7	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C8	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C9	102101	100pF 10% 500V CER DISC	ITT	CD10	—
C10	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C11	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C12	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C13	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C14	101103	10nF 25% 250V CER DISC	ITT	CD10	5
C15	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C16	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C17	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C18	102121	120pF 10% 500V CER DISC	ITT	CD10	1
C19	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C20	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C21	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C22	120018	1µ5F 10% 63V POLYCARB	ASHCROFT	A2B1521B	—
C23	102102	1nF 10% 500V CER DISC	ITT	CD10	2

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C24	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C25	101103	10nF 25% 250V CER DISC	ITT	CD10	—
C26	102101	100pF 10% 500V CER DISC	ITT	CD10	—
C27	102680	68pF 5% 500V CER DISC	ITT	CD10	1
C28	150004	100µF 20% 6V3 DIP TANT	UNION CARBIDE	K100E6V3	1
C29	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C30	110013	100nF 20% 250V POLYESTER	MULLARD	C280AE P100k	1
C31	102150	15pF 5% 500V CER DISC	ITT	CD10	2
C32	102150	15pF 5% 500V CER DISC	ITT	CD10	—
C33	102478	4p7F ±·5pF 500V CER DISC	ITT	CD08	2
C34	102478	4p7F ±·5pF 500V CER DISC	ITT	CD08	—
C35	102228	2p2F ±·5pF 500V CER DISC	ITT	CD08	1
C36	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C37	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C38	150023	33µF 20% 25V DIP TANT	UNION CARBIDE	K33E25	1
C39	130065	1n8F 1% 63V POLYSTYRENE	SUFLEX	HS1800/1–10/63	2
C40	130065	1n8F 1% 63V POLYSTYRENE	SUFLEX	HS1800/1–10/63	—
C41	130082	680pF 1% 30V POLYSTYRENE	SUFLEX	HS	2
C42	102108	1pF ±·5pF 500V CER DISC	ITT	CD06	1
C43	130070	13pF ±·5pF 160V POLYSTYRENE	SUFLEX	HS	2
C44	140058-1	150pF x2 MATCHED SET	DATRON	SEE DRG	1
C45	110042	100nF 20% 63V POLYESTER	WIMA	MKS2	—
C46	130070	13pF ± 1pF 160V POLYSTYRENE	SUFLEX	HS13/1–7/160	—

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
Q15	250011	Si PNP TRANSISTOR	NATIONAL	BC327/TO18	–
Q16	230003	N-CHAN JFET	TELEDYNE	U1899 JF	–
Q17	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/	–
Q18	230027-1	N CHAN JFET	TELEDYNE	U3114 JF	–
Q19	230027-1	N CHAN JFET	TELEDYNE	U3114 JF	–
Q20	230002	N-CHAN JFET	TELEDYNE	U1994 JF	2
Q21	230056	N-CHAN JFET	SILICONIX	J212	1
Q22	240013	Si NPN TRANSISTOR	NATIONAL	BC184C/TO18	–
Q23	230003	N-CHAN JFET	TELEDYNE	U1899 JF	–
Q24		NOT USED			–
Q25	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–
Q26	240006	Si NPN TRANSISTOR	NATIONAL	2N3904/TO18	–
Q27	250011	Si PNP TRANSISTOR	NATIONAL	BC327/TO18	–
Q28	230042	N-CHAN I LIM 3·0mA	TELEDYNE	TCR510	–
Q29	230003	N-CHAN JFET	TELEDYNE	U1899JF	–
Q30		NOT USED			–
Q31	230002	N-CHAN JFET	TELEDYNE	U1994 JF	–
Q32	230035	N-CHAN JFET	TELEDYNE	U1897 JF	3
Q33	230035	N-CHAN JFET	TELEDYNE	U1897 JF	–
Q34	230035	N-CHAN JFET	TELEDYNE	U1897 JF	–
Q35	230058	N-CHAN I LIM 750μA	TELEDYNE	TCR 504	1
Q36	230031	N-CHAN DUAL JFET	SILICONIX	U404	1

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1081 AC PCB ASSY

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					Assy
M1	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076 BCP	3
M2	260050	412 DUAL BIFET OP AMP	NATIONAL	LF412 CN	2
M3	260028	1458 DUAL OP AMP	FAIRCHILD	μA1458 CTC	1
M4	260063	7650 OP AMP	INTERSIL	ICL7650 CTV	4
M5	280015	QUAD D-TYPE	MOTOROLA	MC14076 BCP	–
M6	280015	QUAD D-TYPE	MOTOROLA	MC14076 BCP	–
M7	280011	DUAL D FLIP FLOP	MOTOROLA	MC14013 BCP	2
M8	280011	DUAL D FLIP FLOP	MOTOROLA	MC14013 BCP	–
M9	260063	7650 OP AMP	INTERSIL	ICL7650 CTV	–
M10	260063	7650 OP AMP	INTERSIL	ICL7650 CTV	–
M11	290026	RMS KIT	DATRON	SEE DRG	1
M12	270059	7x DARLINGTON DRIVER	SPRAGUE/EXAR	ULN2004A/XR2204CP	1
M13	260065	OP27 OP AMP	PMI	OP27 FZ	1
M14	260027	714 OP AMP	FAIRCHILD	μA714 HC	2
M15	280116	DUAL 4 CHAN AN MUX	SILICONIX	DG509 CJ	2
M16	260050	412 DUAL BIFET OP AMP	NATIONAL	LF412 CN	–
M17	280116	DUAL 4 CHAN AN MUX	SILICONIX	DG509 CJ	–
M18	290066	FREQ. SENSITIVE SWITCH	CONSUMER MICROCIRCUITS	FX301L	2
M19	290066	FREQ. SENSITIVE SWITCH	CONSUMER MICROCIRCUITS	FX301L	–
M20	260027	714 OP AMP	FAIRCHILD	μA714 HC	–
M21	260063	7650 OP AMP	INTERSIL	ICL7650 CTV	–
M22	260047	2627 OP AMP	HARRIS	HA32627-5	1

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TITLE 1081 AC PCB ASSY

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D1	200001	75mA 75V GP Si DIODE	FAIRCHILD	IN4148	2
D2	210100	10V 400mW ZENER	MULLARD	BZY88C10	3
D3	210100	10V 400mW ZENER	MULLARD	BZY88C10	—
D4	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	10
D5	200001	75mA 75V GP Si DIODE	FAIRCHILD	IN4148	—
D6	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	—
D7	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	—
D8	210120	12V 400mW ZENER	MULLARD	BZY88C12	3
D9	210120	12V 400mW ZENER	MULLARD	BZY88C12	—
D10	220010	Si HOT CARRIER DIODE	HP	HSCH1001 / IN6263	3
D11	210100	10V 400mW ZENER	MULLARD	BZY88C10	—
D12	220010	Si HOT CARRIER DIODE	HP	HSCH1001 / IN6263	—
D13	220010	Si HOT CARRIER DIODE	HP	HSCH1001 / IN6263	—
D14	220036	DUAL 500pF VARICAP DIODE	MULLARD	BB212	1
D15	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	—
D16	213011	1V5 250mW ZENER	MULLARD	BZV46 - 1V5	1
D17	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	—
D18	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	—
D19	210120	12V 400mW ZENER	MULLARD	BZY88C12	—
D20	210110	11V 400mW ZENER	MULLARD	BZY88C11	2
D21	210110	11V 400mW ZENER	MULLARD	BZY88C11	—
D22	200008	200mA 125V LL Si. DIODE	FAIRCHILD	IN458A	—
D23	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	—

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D24	200008	200mA 125V LL.Si. DIODE	FAIRCHILD	IN458A	—
D25	200008	200mA 125V LL.Si. DIODE	FAIRCHILD	IN458A	—
D26	220020	FET DIODE 100pA IR	TELEDYNE	PAD100/INSUL'D CASE	1
Q1	230001	N-CHAN CURRENT LIM 1·4mA	TELEDYNE	TCR 506	3
Q2	230001	N-CHAN CURRENT LIM 1·4mA	TELEDYNE	TCR 506	—
Q3	230027-1	N-CHAN JFET	TELEDYNE	U3114JF	3
Q4	240013	Si NPN TRANSISTOR	NATIONAL	BC184C/TO18	2
Q5	240006	Si NPN TRANSISTOR	NATIONAL	BC3904/TO18	3
Q6	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	4
Q7	230042	N-CHAN I LIM 3·0mA	TELEDYNE	TCR510	3
Q8	230003	N-CHAN JFET	TELEDYNE	U1899JF	4
Q9	250011	Si PNP TRANSISTOR	NATIONAL	BC327/TO18	3
Q10	230001	N-CHAN CURRENT LIM 1·4mA	TELEDYNE	TCR 506	—
Q11	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	1
Q12	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	—
Q13	240006	Si NPN TRANSISTOR	NATIONAL	BC3904/TO18	—
Q14	230042	N-CHAN I LIM 3·0mA	TELEDYNE	TCR510	—

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	090107-1	5kO 0·1% WIRE WOUND	MANN	MATCHED SET. (R1 & R3)	(1 SET)
R2	090001	P.T.C. THERMISTOR	MULLARD	VA8650	2
R3	090107-1	1MO 0·1% WIRE WOUND	MANN		–
R4		NOT USED			–
R5		NOT USED			–
R6	000392	3K9 5% 1/4W CARBON	MULLARD	CR25	2
R7	000106	10M " " "	"	"	3
R8	019761	9K76 1% 50ppm M.F.	HOLCO	H8	1
R9	090001	P.T.C. THERMISTOR	MULLARD	VA8650	–
R10	000223	22k 5% 1/4W CARBON	MULLARD	CR25	2
R11	000106	10M 5% 1/4W CARBON	MULLARD	CR25	–
R12	000563	56K " " "	"	"	3
R13	000563	56K " " "	"	"	–
R14	000121	120R " " "	"	"	1
R15	011502	15kO 1% 1/8W 50ppm MF	HOLCO	H8C	1
R16	011212	12k1 " " "	"	"	1
R17	000273	27k 5% 1/4W CARBON	MULLARD	CR25	3
R18	090111-	100M " THICK FILM	HOLSWORTHY	SEE DRG	1
R19	000104	100K " 1/4W CARBON	MULLARD	CR25	7
R20	000104	100k " " "	"	"	–
R21	000104	100k " " "	"	"	–
R22	000222	2K2 5% 1/4W CARBON	"	"	2
R23	000391	390R " " "	"	"	1

NOTES: CIRCUIT DIAGRAM. = 430505
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TITLE 1081 OHMS P.C.B ASSY.

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R24	070160-2	57k33 ·1% 1ppm WW	MANN	SEE DRG	1
R25	070161-2	573k3 ·1% 1ppm WW	MANN	SEE DRG	1
R26	063104	100k POT CERMET	BECKMANN	72 P	1
R27		NOT USED			–
R28	000105	1M 5% 1/4W CARBON	MULLARD	CR25	3
R29	070159-2	5k733 ·1% 1ppm WW	MANN	SEE DRG	1
R30	070158-2	1k274 ·1% 1ppm WW	MANN	SEE DRG	2
R31	070158-2	1k274 ·1% 1ppm WW	"	SEE DRG	–
R32	000473	47k 5% 1/4W CARBON	MULLARD	CR25	6
R33	000473	47k 5% 1/4W CARBON	MULLARD	CR25.	–
R34	001271	270R 5% 1/2W CARBON	"	CR37	1
R35	041004	1MOO 1% 1/2W 100ppm CF	ALLEN BRADLEY	CC	1
R36	015621	5k62 1% 1/8W 50ppm MF	HOLCO	H8C	1
R37	012742	27k4 1% 1/8W 50ppm MF	HOLCO	H8C	2
R38	012742	27k4 1% 1/8W 50ppm MF	HOLCO	H8C	–
R39		F.S.V			–
R40		F.S.V			–
R41	000473	47K 5% 1/4W CARBON	MULLARD	C	–
R42	000624	620K " " "	"	"	1
R43	000473	47K " " "	"	"	–
R44	000102	1K " " "	"	"	3
R45	000102	1K " " "	"	"	–
R46	000562	5K6 " " "	"	"	1

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TITLE 1081 OHMS P.C.B ASSY.

DRAWING NUMBER 400505
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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
1	120029	6800pF 20% 100V POLYCARB	WIMA	FKC-2 MIN	1
C2	1200 26	680pF 20% 100V POLYCARB	WIMA	FKC-2 MIN	1
C3	101 103	·01µF 250v CER DISC	ERIE	801	6
C4	101 103	·01µF 250V CER DISC	ERIE	801	–
C5	102222	2n2F 500V CER DISC	ERIE	801	1
C6	101103	·01µF 250V CER DISC	ERIE	801	4
C7	102332	3n3F 500V CER DISC	ERIE	801	1
C8	120014	2·2µF 10% 63V POLYCARB	ASHCROFT	A2B2221B.	2
C9	120014	2·2µF " " "	"	"	–
C10	110013	0·1µF 10% 250V POLYESTER	MULLARD	C280AE/P100K.	6
C11	150001	22µF 20% 16V DIP TANT	UNION CARBIDE	K22E16	2
C12	101 103	·01µF 250V CER DISC	ERIE	801.	–
C13	150001	22µF 20% 16V DIP TANT	UNION CARBIDE	K22E16	–
C14	101 103	·01µF 250V CER DISC	ERIE	801	–
C15	102100	10pF 500V CER DISC	"	"	2
C16	102100	10pF " " "	"	"	–
C17	102102	1nF " " "	"	"	1
C18	120021	0·47µF 10% 63V POLYCARB	ASHCROFT	A2B4711B	1
C19	150014.	680nF 20% 35V DIP TANT	UNION CARBIDE	KR68E35	1
C20	150016	1µF 20% 35V DIP TANT	UNION CARBIDE	K1R0E35	1
C21	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	4
C22	101103	·01µF 250V CER DISC	ERIE	801	–
C23	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25.	–

NOTES.

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TITLE 1081 OHMS P.C.B ASSY.
DRAWING NUMBER 400505
SHEET 6 OF 12

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C24	120013	150nF 10% 63V POLYCARB	ASHCROFT	A2B1511B	1
C25	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	-
C26, C34	102101	100pF 10% 500v CER DISC	ITT	CD10	2
C27	110005	10nF 20% 250v POLYESTER	MULLARD	C280AEP10K	1
C28-C31, C33	110013	100nF 20% 250V POLYESTER	MULLARD	C280AE P100K	–
C32	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	–
D1	213001	10V 5W ZENER	MOTOROLA	1N5347	3
D2	213001	10V " "	"	"	–
D3		NOT USED			–
D4		NOT USED			–
D5	210100	10V 400mW ZENER	MULLARD	BZY88C10	2
D6	210100	10V 400mW ZENER	MULLARD	BZY88C10	–
D7	210027	2V7 400mW ZENER	MULLARD	BZY88C2V7	1
D8	200001	Si G.P.	FAIRCHILD	1N4148	10
D9		NOT USED			–
D10	213001	10V 5W ZENER	MOTOROLA	1N5347	–
D11	213002	5V1 " "	"	1N5338B	1
D12	200001	Si G.P.	FAIRCHILD	1N4148	–
D13		NOT USED			
D14	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	3
D15	200001	Si GP	"	1N4148	–
D16	210082	8V2 400mW ZENER	MULLARD	BZY88C8V2	1
D17	210130	13V 400mW ZENER	"	BZY88C13	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
RL1	330012-1	REED RELAY 1A GUARDED	HAMLIN	HE721A5134	4
RL2	330018-1	RELAY 2P2W 7V HOLD-IN	AMF	SEE DRG	2
RL3	330018-1	RELAY 2P2W 7V HOLD-IN	AMF	SEE DRG	–
RL4	330012-1	REED RELAY 1A GUARDED	HAMLIN	HE721A5134	–
RL5	330012-1	REED RELAY 1A GUARDED	HAMLIN	HE721A5134	–
RL6	330012-1	REED RELAY 1A GUARDED	HAMLIN	HE721A5134	–
	450388-1	GUARD SHIELD			1
	400379/5	WIRE/TERMINAL ASSY			1
	410217-2	PCB			1
	459112-2	RELAY BRACKET			2
	540002	22SWG BTC WIRE			A/R
	540008	7/·2 PTFE INSUL. (WHITE) WIRE			490 mm
J1, J2	571095/C	16 WAY AP/3M RIBBON CABLE			2
	590001	SLEEVE MAX CABLE ∅ 3·0	HELLERMANN ELECTRIC	H15 × 20mm BLACK HELSYN	7
	590004	SLEEVE – PTFE	HELLERMANN ELECTRIC	FE10	A/R
	605059	8 WAY D.I.L. SOCKET			4
	602001	FSV TERMINAL	MOLEX	02-04-1875	2
	602004	BREAKAWAY TERML STRIP	MOLEX	05-30-0001	16
J3	605052	8 WAY POLARISED SOCKET	MOLEX	(22-01-2085) 6471-8-1	1
	605060	14 PIN DIL SOCKET	ASTRALUX	ICL143-S3T	2
	605061	16 PIN DIL SOCKET	ASTRALUX	ICL163-S6T	6
	605057	CRIMP TERMINAL	MOLEX	4809-GL	2

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TITLE 1081 AC PCB ASSY

DRAWING NUMBER 400504 SHEET 18 OF 19

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
	611007	M3 × 6mm POZI CSK STEEL	ZN.PL.		3
	611016	M3 × 8mm POZI PAN STEEL	ZN.PL.		5
	612021	M3 × 16mm SPACER	HARWIN	R6377-02	3
	613005	M3 INT. SHAKEPROOF			2
	613014	M2·5 INT. SHAKEPROOF			2
	615002	M3 FULL NUT STEEL ZN.PL.			2
	615005	3-48 UNC FULL NUT STEEL	ZN.PL.		2
	617010	NYLATCH PLUNGER 3/16"	HARTWELL CORP	HN3P-32-4-1	5
	617011	NYLATCH GROMMET 3/16"	HARTWELL CORP	HN3G-32-1	5
	620003	SOLDER PIN	HARWIN	H2105A01	4
	620005	CLOVERLEAF PTFE INSUL.	SEALECTRO	FTE15P59	18
	620007	TEST POINT TERMINAL	MICROVAR	TYPE C30	10
	630107	BRASS STRIP 15·5 × ·38 mm	RIGHTON	CZ108 ½H	220 mm
	613029	M3 CRINKLE WASHER S.S.			3

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TITLE 1081 AC PCB ASSY

DRAWING NUMBER 400504 SHEET 19 OF 19

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R47	000473	47K 5% ¼W CARBON	MULLARD	CR25	–
R48	000563	56k " " "	"	"	–
R49	000392	3K9 " " "	"	"	–
R50	000182	1k8 " " "	"	"	1
R51	000105	1M " " "	"	"	–
R52	000104	100K " " "	"	"	–
R53	000273	27K " " "	"	"	–
R54	000104	100K " " "	"	"	–
R55	000474	470k " " "	"	"	1
R56	000824	820K " " "	"	"	1
R57	000104	100K " " "	"	"	–
R58	000273	27K " " "	"	"	–
R59	000104	100K " " "	"	"	–
R60	000123	12K " " "	"	"	1
R61	000334	330K " " "	"	"	1
R62	000222	2K2 " " "	"	"	–
R63	000223	22K " " "	"	"	–
R64	000333	33K " " "	"	"	2
R65	000821	820R " " "	"	"	1
R66	000105	1M " " "	"	"	–
R67	000473	47k " " "	"	"	–
R68	000102	1k " " "	"	"	–
R69	000103	10k " " "	"	"	1

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DRAWING NUMBER 400505
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J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R70	000681	680R 5% ¼W CARBON	MULLARD	CR25	1
R71		NOT USED			—
R72	000333	33k 5% ¼W CARBON	MULLARD	CR25	—
R73	000823	82k 5% ¼W CARBON	MULLARD	CR25	1
R74	000106	10M 5% ¼W CARBON	MULLARD	CR25	—
R77	000112	1k0 5% ¼W CARBON	MULLARD	CR25	1
AN1	09 0121	100k x 8 2% NETWORK	BECKMAN	L09-1-R100K	1

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DRAWING NUMBER 400505
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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M1	280022	QUAD BILATERIAL SWITCH	MOTOROLA	MC 14016 BCP	2
M2	280022	" " "	"	"	—
M3	260027	OP AMP 714	FAIRCHILD	μA 714 HC	1
M4	260026	OP AMP	NATIONAL	LM 212	1
M5	280025	QUAD ANALOGUE SWITCH	MOTOROLA	MC 14066 BCP	1
M6	280072	M'STABLE/ASTABLE M'VIBR	R.C.A.	CD 4047 AE	1
M7	280015	QUAD LATCH	MOTOROLA	MC 14076 BCP	2
M8	280015	" "	"	"	—
M9	280011	DUAL D FLIP FLOP	MOTOROLA	MC 14013 BCP	1
M10	260053	7650 OP AMP	INTERSIL	ICL7650 CPD	1

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SHEET 10 OF 12

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
RL1	330019-	RELAY 4P2W 7V HOLD-IN	AMF	SEE DRAWING	1
	400379/2	WIRE/TERMINAL ASSY			6
	410218-	OHMS P.C.B.			1
	459112-2	RELAY BRACKET.	KDP		1
	540008	7/0·2 PTFE INSULATED WHITE		TYPE 'C	280mm.
	540002	22 SWG TINNED COPPER WIRE.			A/R
	590001	SLEEVE MAX CABLE ∅ 3·0	HELLERMANN ELECTRIC	H15 x 20mm BLK HELSYN	9
	590004	SLEEVE P.T.F.E	"	FE10	A/R
	590055	SLEEVE ∅ 1·0 SIL. RUBBER	HELLERMANN ELECTRIC	H15 CONT. BLACK	30mm
	602001	F.S.V. TERMINAL	MOLEX	02-04-1875	4
J2	571095/C	16 WAY AP\3M RIBBON CABLE	DATRON		1
	605060	14 WAY DIL SOCKET	ASTRALUX	ICL-143-S3T.	5
	605061	16 WAY DIL SOCKET	ASTRALUX	ICL-163-S6T.	2
J1	605053	2 WAY POLARISED SOCKET	MOLEX	22-01-2125	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D18	200008	Si Low LEAKAGE	FAIRCHILD	IN458A	–
D19	200001	Si G.P	"	IN4148	–
D20	200001	Si "	"	"	–
D21	200001	Si "	"	"	–
D22	200001	Si "	"	"	–
D23	200001	Si "	"	"	–
D24		NOT USED			–
D25		NOT USED			–
D26	200001	Si G.P	FAIRCHILD	IN4148	–
D27	200001	Si "	"	"	–
D28	200008	Si Low LEAKAGE	"	IN458A	–
Q1		NOT USED			–
Q2	230027 - 1	N-CHAN JFET	TELEDYNE	U3114JF	6
Q3	230027 - 1	" " "	"	"	–
Q4	230027 - 1	" " "	"	"	–
Q5	230002	N-CHAN J FET	SILICONIX	U1994E	5
Q6	230027 - 1	N-CHAN J FET SELECTED	TELEDYNE	U3114E	–
Q7	230027 - 1	" " "	"	"	–
Q8	230002	N-CHAN J FET	SILICONIX	U1994E	–
Q9	230002	" "	"	"	–
Q10	230031	N-CHAN DUAL JFET	TELEDYNE	SU265M	1
Q11	230029	N-CHAN J FET	SILICONIX	J309	4

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DATE	DRAWING NUMBER 400505 — SHEET 8 OF 12

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q12	230055	N-CHAN I LIM 430µA	TELEDYNE	TCR502	1
Q13	240012	Si NPN	NATIONAL	2N3053	1
Q14	230027 - 1	N-CHAN J FET	TELEDYNE	U3114E	–
Q15	250001	Si PNP	NATIONAL	BC214	2
Q16	250011	Si PNP	NATIONAL	BC327	1
Q17	240001	Si NPN	NATIONAL	BC184	2
Q18	240001	Si NPN	NATIONAL	BC184	–
Q19	250001	Si PNP	NATIONAL	BC214	–
Q20	230002	N-CHAN J FET	SILICONIX	U1994E	–
Q21	230029	N-CHAN J FET	"	J309.	–
Q22	230029	" "	"	"	–
Q23		NOT USED			–
Q24	230002	N-CHAN J FET	SILICONIX	U1994E	–
Q25	230029	" "	"	J309.	–

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R1		NOT USED			—
R2	000332	3K3 5% ¼W CARBON	MULLARD	CR25	6
R3	000332	3K3 " " "	"	"	—
R4	000103	10K " " "	"	"	6
R5	000123	12K " " "	"	"	2
R6	000222	2K2 " " "	"	"	2
R7	000222	2K2 " " "	"	"	—
R8	000123	12K " " "	"	"	—
R9	000333	33K " "	"	"	1
R10		NOT USED			—
R11	000103	10K 5% ¼W CARBON	MULLARD	CR25	—
R12	000105	1 M " " "	"	"	1
R13	000332	3k3 " " "	"	"	—
R14	000103	10k " " "	"	"	—
R15	000332	3k3 " " "	"	"	—
R16	000332	3k3 " " "	"	"	—
R17	000681	680R " " "	"	"	2
R18	000681	680R " " "	"	"	—
R19	000332	3k3 " " "	"	"	—
R20	000103	10k " " "	"	"	—
R21	000103	10K " " "	"	"	—
R22	000103	10k " " "	"	"	—

NOTES CIRCUIT DIAGRAM = 430506
CHECK PROCEDURE = 460506
CHECK LIST = 470506.
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TITLE REAR INPUT / RATIO ASSY. 1081
DRAWING NUMBER 400506
SHEET 3 - 8

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C1	150022	2μ2F 20% 35V DIP. TANT	UNION CARBIDE	K2R2E35	2
C2	150022	2μ2F 20% 35v DIP. TANT	UNION CARBIDE	K2R2E35	—
C3	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	2
C4	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C5	102101	100pF 10% 500V CER DISC	ITT	CD10	1
C6	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100K	1
C7	150014	680nF 20% 35V DIP TANT	UNION CARBIDE	KR68E35	2
C8	150014	680nF 20% 35V DIP TANT	UNION CARBIDE	KR68E35	—

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TITLE REAR INPUT/RATIO 1081
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SHEET 4 OF 8

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R47	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R48	000104	100k " " "	"	"	—
R49	000103	10k " " "	"	"	—
R50		NOT USED			—
R51	000101	100R 5% ¼W CARBON	MULLARD	CR25	2
R52	000123	12k " " "	"	"	2
R53	000123	12k " " "	"	"	—
R54	000105	1M " " "	"	"	—
R55	000684	680k " " "	"	"	—
R56	000823	82 k " " "	"	"	1
R57		NOT USED			—
R58	000100	10R 5% ¼W CARBON	MULLARD	CR25	2
R59	000220	22R " " "	"	"	2
R60	000220	22R " " "	"	"	—
R61	000100	10R " " "	"	"	—
R62		NOT USED			—
R63	000222	2k2 5% ¼W CARBON	MULLARD	CR25	—
R64	000222	2k2 " " "	"	"	—
R65	000103	10k " " "	"	"	—
R66	000103	10k " " "	"	"	—
R67	000271	270R " " "	"	"	1
R68	000103	10k " " "	"	"	—
R69		NOT USED			—

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DRAWING NUMBER 400526
SHEET 4 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R70		NOT USED			—
R71		NOT USED			—
R72		NOT USED			—
R73		NOT USED			—
R74	000124	120k 5% ¼W CARBON	MULLARD	CR25	1
R75	000471	470R " " "	"	"	1
R76	000473	47k " " "	"	"	1
R77		NOT USED			—
R78		NOT USED			—
R79	000472	4k7 5% ¼W CARBON	MULLARD	CR25	—
R80	000683	68k " " "	"	"	—
R81	000183	18k " " "	"	"	1
R82	000334	330k " " "	"	"	1
R83	063202	2K POT CERMET	BECKMAN	72 P	1
R84	000223	22k 5% ¼W CARBON	MULLARD	CR25	1
R85	000472	4k7 " " "	"	"	—
R86		NOT USED			—
R87	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R88	000103	10k " " "	"	"	—
R89	000103	10k " " "	"	"	—
R90		NOT USED			—
R91	012002	20k0 1% ⅛W 50ppm MF	HOLCO	H8C	1
R92	015231	5k23 " " "	"	"	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	611004	SCREW M3X6mm STEEL POZIPAN ZINC PLATED .GKN			1
	613005	WASHER M3 INT/SHAKEPROOF	GKN DISTRIBUTORS	ZINC PLATED	1
	613014	WASHER M2·5 INT/SHAKEPROOF	GKN DISTRIBUTORS	ZINC PLATED	1
	615002	NUT M3 FULL HEX STEEL		ZINC PLATED	1
	615005	NUT 3-48UNC FULL HEX	STEEL	" "	1
	617010	NYLATCH PLUNGER HN3P	ORDER FROM C.J. FOX & SONS.	HN3P-32-4-1	4
	617011	NYLATCH GROMMET HN3G		HN3G-32-1	4
	618002	TO5 MOUNTING PAD	JERMYN	TO518-004D	1
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	8
	630024	STANDARD STEATITE INSUL BEAD.	PARK ROYAL PORCELAIN CO.	TYPE No2 (16 SWG)	8
	620007	TEST POINT TERMINAL	MICROVAR	C 30	10
	900004	SILICONE RUBBER COMPOUND	RS	555-588	A/R

NOTES.

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TITLE 1081 OHMS P.C.B ASSY

DRAWING NUMBER 400505
SHEET 12 OF 12

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
	590001	SLEEVE MAYCABLE ϕ 3·0mm	HELLERMANN ELECTRIC.	H15 x 20mm BLK HELSYN.	23
	590004.	SLEEVE - PTFE	" "	FE10	A/R
	602007	RELAY SOCKET 2POLE PCB MOUNT	POTTER & BRUMFIELD	27E212	1
	602009	RELAY SOCKET 4POLE PCB MOUNT	" "	27E213	1
J10, J11	604008	7 WAY PLUG PANEL MOUNT	PYE CONNECTORS	M7P	2
	605009	7 WAY SOCKET	PYE CONNECTOR	M7S	2
–	605060	14 WAY DIL SOCKET	ASTRALUX OR JERMYN	ICN-246-S4T OR A23-2023Y	1
	605057	CRIMP TERMINAL	MOLEX	4809-GL	2
	606001	LOCKING HOOD	PYE CONNECTORS.	MHN	2
	606002	NUT	PYE CONNECTORS.	MN	2
	606003	WASHER	" "	MLW	2
	611004	SCREW M3X6mm STEEL POZI-PAN. ZINC PLATED	. GKN.		7
	611007	SCREW M3X6mm STEEL POZI-CSK. ZINC PLATED	. GKN.		7
	611016	" M3X8mm " " PAN " "	"		4
	612020	STANDOFF NYLON M3 X 19 TRANSIPILLAR.	W.K. ELECTRONICS	TP1/6·5/19/M3/I/I	5

NOTES.

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TITLE REAR INPUT / RATIO ASSY 1081
DRAWING NUMBER 400506
SHEET 7 OF 8

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
	613005	WASHER M3 INT/SHAKEPROOF ST.	GKN DISTRIBUTORS	ZINC PLATED	13
	615001	NUT 8BA FULL HEX STEEL		ZINC PLATED	2
	615002	" M3 " " "		" "	2
	630005	CLIP FOR P&B R10 2POLE RELAY.	POTTER & BRUMFIELD	20C249	1
	630028	CLIP FOR P&B R10 4POLE RELAY.	" "	20C250	1

NOTES

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DRAWING NUMBER 400506
SHEET 8 OF 8

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000103	10k 5% ¼W CARBON	MULLARD	CR25	21
R2	000103	10k " " "	"	"	—
R3	000103	10k " " "	"	"	—
R4	000103	10k " " "	"	"	—
R5	000103	10k " " "	"	"	—
R6	000102	1k " " "	"	"	5
R7	000103	10k " " "	"	"	—
R8	000472	4k7 " " "	"	"	8
R9	000273	27k " " "	"	"	1
R10	000684	680k " " "	"	"	2
R11	063204	200k POT CERMET	BECKMAN	72P	1
R12	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R13	000102	1k " " "	"	"	—
R14		NOT USED			—
R15	000472	4k7 5% ¼W CARBON	"	"	2
R16	000332	3k3 " " "	"	"	3
R17	000683	68k " " "	"	"	2
R18	000222	2k2 " " "	"	"	6
R19	000393	39k " " "	"	"	1
R20	000104	100k " " "	"	"	7
R21	000104	100k " " "	"	"	—
R22	000104	100k " " "	"	"	—
R23	000221	220R " " "	"	"	1

NOTES. CIRCUIT DIAGRAM = 430526
CHECK PROCEDURE = 460526
CHECK LIST = 470526
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ISS.	1	2	3	4
E.C.O	RELEASED	1479/87/89	1461	1503
DATE	31.3.83	18.5.83	26.5.83	20.6.83
CHKD		BJ.	MD	MD

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TITLE 1081 DIGITAL PCB. ASSY.
DRAWING NUMBER 400526
SHEET 2 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R24	000102	1k 5% ¼W CARBON	MULLARD	CR25	—
R25	000332	3k3 " " "	"	"	—
R26	000103	10k " " "	"	"	—
R27	000102	1k " " "	"	"	—
R28	000682	6k8 " " "	"	"	1
R29		NOT USED			—
R30		NOT USED			—
R31	000472	4k7 5% ¼W CARBON	MULLARD	CR25	—
R32	000472	4k7 " " "	"	"	—
R33	000222	2k2 " " "	"	"	—
R34		NOT USED			—
R35		NOT USED			—
R36		NOT USED			—
R37		NOT USED			—
R38		NOT USED			—
R39	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R40	000103	10k " " "	"	"	—
R41	000332	3k3 " " "	"	"	—
R42	000103	10k " " "	"	"	—
R43	000104	100k " " "	"	"	—
R44	000103	10k " " "	"	"	—
R45	000364	360k " " "	"	"	1
R46	000472	4k7 " " "	"	"	—

NOTES.

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DRAWING NUMBER 400526
SHEET 3 OF 16

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
D1	200001	75mA 75V G.P. Si DIODE	FAIRCHILD	IN4148.	6
D2	200001	" " " " "	"	"	–
D3	200001	" " " " "	"	"	–
D4	200001	" " " " "	"	"	–
D5		NOT USED			–
D6		NOT USED			–
D7	200001	75mA 75V G.P. Si. DIODE	FAIRCHILD	IN4148	–
D8	200001	" " " " "	"	"	–
Q1	240001	Si NPN TRANSISTOR	NATIONAL	BC184/TO18	4
Q2	240001	" " "	"	"	–
Q3	250001	Si PNP TRANSISTOR	NATIONAL	BC214/TO18	2
Q4	250001	" " "	"	"	–
Q5	240001	Si NPN TRANSISTOR	NATIONAL	BC184/ TO18	–
Q6	240001	" " "	"	"	–
M1	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013 BCP	1
J1	604036	CON. PIN. STRIP OF 10. HORIZ. TYPE.	AMP	163740-8	2
J2, J3	605052	8 WAY POLARISED SOCKET.	MOLEX	(22-01-2085) 6471-8-1	2

NOTES.

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TITLE REAR INPUT / RATIO ASSY. 1081

DRAWING NUMBER 400506
SHEET 5 OF 8

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
J4 & J6	604033	FLAT WAFER PIN (4 WAY GOLD)	MOLEX	22-27-2041 / GOLD	3
J5	605051	4 WAY POLARISED SOCKET	MOLEX	22-01-2045	1
	400379/4	WIRE/TERMINAL ASSY.	HOLDEN CORDS		6
	400379/5	" " "	" "		4
RL1 & RL4.	330018-1	RELAY 2P2W 7V HOLD-IN	P&B	SEE DRAWING	2
RL2 & RL3.	330019-1	RELAY 4P2W 7V HOLD-IN	P&B	SEE DRAWING	2
	410106-5	COMPONENT PCB.			1
	410132-4	RELAY PCB.			1
	450185-1	SOCKET PLATE			1
	450241-1	RELAY BRACKET			1
	540002	22SWG TINNED COPPER WIRE			A/R
	540008	7/.2 PTFE INS. WHITE WIRE			140mm

NOTES.

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DRAWING NUMBER 400506
SHEET 6 OF 8

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C24	130015	120pF 2½% 25v POLYSTYRENE	SOFLEX	HS	1
C25	102471	470pF 500v CER DISC	ERIE	801	2.
C26	150016	1µF 20% 35v DIP TANT	UNION CARBIDE	KIROE35	–
C27	150002	10µF " 16v " "	" "	KIOE16	∓
C28	102220	22pF 500v CER DISC	ERIE	801	3
C29	150016	1µF 20% 35v DIP TANT	UNION CARBIDE	KIROE35	–
C30		NOT USED			–
C31	110005	·01µF 10% 250v POLYESTER	MULLARD	C280AE/PIOK	|
C32	120020	220nF 10% 63V POLYCARB	ASHCROFT	A2B2211B	|
C33	150014	·68µF 20% 35v DIP TANT	UNION CARBIDE	KR68E35	|
C34	101103	·01µF 250v CER DISC	ERIE	801	–
C35	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	–
C36	101103	·01µF 250v CER DISC	ERIE	801	∓
C37	102220	22pF 500v CER DISC		"	–
C38	102221	220pF 500v " "	"	"	2
C39	101103	·01µF 250v " "	"	"	—
C40		NOT USED			—
C41	110027	3n3F 20% 100V POLYESTER	WIMA	FKS2MIN	|
C42	102471	470pF 500v CER DISC	ERIE	801	–
C43	102101	100pF 500v CER DISC.	"	801	–
C44	150002	10µF 20% 16v DIP. TANT	UNION CARBIDE	K10E16	–
C45	150016	1µF 20% 35v " "	" "	KIROE35	—
C46	102220	22pF 500v CER DISC	ERIE	801	—

NOTES.

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TITLE 1081 DIGITAL PCB. ASSY.

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SHEET 8 OF 16

LW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C47	150004	100µF 20% 6V3 DIP. TANT.	UNION CARBIDE	K100E6V3	1
C48		NOT USED			–
C49	101103	·01µF 250v CER.DISC	ITT	CD10	–
C50	102101	100pF 500v CER. DISC	ITT	801	–
C51	102101	100pF 500v CER. DISC	ITT	801	–
C52	102101	100pF 500V CER DISC	ITT	801	–
C53	102221	220pF 500v CER. DISC	ERIE	801	–

NOTES.

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SHEET 9 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R93		NOT USED			—
R94	000102	1k 5% ¼W CARBON	MULLARD	CR25	—
R95	000472	4k7 " "	"	"	—
R96	000103	10k " " "	"	"	—
R97	000222	2k2 " " "	"	"	—
R98	000101	100R " " "	"	"	—
R99	000104	100k 5% ¼W CARBON	"	"	—
R100		NOT USED			—
R101		NOT USED			—
R102	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R103	000222	2k2 " "	"	"	—
					—
AN1	090046	10k × 7 2% NETWORK	BECKMAN	764-1-R10k	5
AN2		NOT USED			—
AN3	090046	10k × 7 2% NETWORK	BECKMAN	764-1-R10k	—
AN4		NOT USED			
AN5	090046	10k × 7 2% NETWORK	BECKMAN	764-1-R10k	—
AN6	090046	10k × 7 2% NETWORK	BECKMAN	764-1-R10k	—
AN7	090046	10k × 7 2% NETWORK	BECKMAN	764-1-R10K	—

NOTES.

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SHEET 6 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C1	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	13
C2	150002	10µF " " " "	" "	"	—
C3	150002	10µF " " " "	" "	"	—
C4	150016	1 µF " 35v " "	" "	K1R0E35	6
C5	110013	·1 µF 10% 250v POLYESTER	MULLARD	C280AE/P100k	2
C6	101103	·01µF 250v CER DISC	ERIE	801	5
C7	150006	4·7µF 20% 16v DIP TANT	UNION CARBIDE	K4R7E16	1
C8		NOT USED			—
C9	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C10	102101	100pF 500v CER DISC	ERIE	801	6
C11	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C12	150016	1µF " 35v " "	" "	K1R0E35	—
C13	150002	10µF " 16v " "	" "	K10E16	—
C14	110013	0·1µF 10% 250v POLYESTER	MULLARD	C280AE/P100K	—
C15	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K1R0E16	—
C16	102102	1nF 500v CER DISC	ERIE	801	1
C17	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C18	150002	10µF " " " "	" "	"	—
C19	150016	1µF " 35v " "	" "	K1R0E35	—
C20	150002	10µF " " " "	" "	K10E16	—
C21	102101	100pF 500v CER DISC	ERIE	801	—
C22		NOT USED			—
C23	130059	470pF 2½% 25V POLYSTYRENE	SUFLEX	HSQ 470/2½-7/25	1

NOTES.

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SHEET 7 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
				MC14013BCP	2
M1	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14016BCP	1
M2	280022	QUAD BILATERAL SWITCH	"	MC14503BCP	7
M3	280024	TRI-STATE HEX NON-INV. BUFFER	"	"	–
M4	280024	" " " " " "	"	"	–
M5	280024	" " " " " "	"		–
M6	280024	" " " " " "	"	MC14076 BCP	5
M7	280015	QUAD LATCH	"	"	–
M8	280015	" "	"	"	–
M9	280015	" "	"	MC14503BCP	–
M10	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14076BCP	–
M11	280015	QUAD LATCH	"	"	–
M12	280015	" "	"	MC 14516BCP	2
M13	280044	BINARY UP/DOWN COUNTER	"	"	–
M14	280044	" " " "	"	NE 555V	3
M15	290003	TIMER - ASTABLE	SIGNETICS	74LS155	1
M16	270058	DUAL 1-of-4 DECODER	NATIONAL	74LS00	2
M17	270048	QUAD 2 I/P NAND GATE	NATIONAL	TMS2532JL(290120-1SS)	1
M18	290120-19C	2532 EPROM PROGRAMMED	DATRON		2
M19	280066-1	256×4 BIT STATIC CMOS RAM	SEE DRAWING		

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DATE	SHEET 12

AW. 1104

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
					–
M20	280066-1	256×4 BIT STATIC CMOS RAM	SEE DRAWING	DM 74LS125N	1
M21	270064	QUAD TRISTATE BUFFER	NATIONAL	MC14013BCP	–
M22	280011	DUAL D FLIP-FLOP	"	ZNA 2035	1
M23	270053	A-D CHIP	FERRANTI	MC14503BCP	–
M24	280024	TRI-STATE HEX NON-INV BUFFER	MOTOROLA	"	–
M25	280024	" " " " "	"	MC14027BCP	1
M26	280006	DUAL J-K FLIP-FLOP	"		–
M27		NOT USED		74LS21	2
M28	270051	DUAL 4 I/P AND GATE	NATIONAL	74LS20	2
M29	270055	DUAL 4 I/P NAND GATE	"	TMS 2532 JL (290119-1SS)	1
M30	290119-19C	2532 EPROM PROGRAMMED	DATRON		2
M31	280096	1K ×4BIT STATIC CMOS RAM	SEE DRAWING	74LS42N	1
M32	270069	BCD/DECIMAL DECODER LS	NATIONAL	74LS21	–
M33	270051	DUAL 4 I/P AND GATE	"	74LS20	–
M34	270055	DUAL 4 I/P NAND GATE	"	TMS 2532 JL (290118-1SS)	1
M35	290118-19C	2532 EPROM PROGRAMMED	DATRON		–
M36	280096	1K ×4BIT STATIC CMOS RAM	SEE DRAWING	MC14066BCP	2
M37	280025	QUAD BILATERAL SWITCH	MOTOROLA	HEF4025P	2
M38	280071	TRIPLE 3 I/P NOR GATE	MULLARD	MC14069 BCP	1
M39	280017	HEX INVERTER	MOTOROLA	HEF4001BP	1
M40	280083	QUAD 2 I/P NOR GATE	MULLARD		–
M41	– –	NOT USED			–
M42		NOT USED			

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	400379/1	WIRE/TERMINAL ASSY.			7
J6		NOT USED			–
X1	800020-1	1·6384 MHz CRYSTAL	CRYSTAL ELECTRONICS	STYLE D	1
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	5
	620007	TEST POINT TERMINAL	MICROVAR	C 30	24
	630036	STANDARD STEATITE INSUL.BEAD	PARK ROYAL PORCELAINS	TYPE Nº 1 (18SWG)	2
	540008	7/·2 WHITE PTFE INSULATED	1kVrms TO BSG210 TYPE C		260mm
	590001	SLEEVE MAX CABLE ∅3·0	HELLERMANN ELECTRIC	H15 × 20mm BLACK HELSYN	1
	590006	HEATSINK SLEEVE ∅2·4	R.S. OR HELLERMANN	399-495 OR LVR24	20mm
	601002	GOLD PIN ∅1·47 PCB MNT	AMP	60803-1	1
	602003	GOLD SOCKET ∅1·47 CRIMP	AMP	60983-1	1
	613009	4BA SOLDER TAG BRASS TIN PL.			1

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DRAWING NUMBER 400526

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A.O. 1304

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M43	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	–
M44	270048	QUAD 2 I/P NAND GATE	NATIONAL	74 LS 00	–
M45	270050	HEX INVERTER	"	74 LS 04	1
M46	280025	QUAD BILATERAL SWITCH	MOTOROLA	MC14066BCP	–
M47	280070	DIVIDE-BY-8 COUNTER/DIVIDER	MULLARD	HEF 4022P	1
M48	280071	TRIPLE 3 I/P NOR GATE	"	HEF 4025P	–
M49	280023	QUAD 2 I/P NOR GATE	MOTOROLA	MC14001 BCP	1
M50		NOT USED			–
M51		NOT USED			–
M52	270056	8 I/P NAND GATE	NATIONAL	74 LS 30	1
M53	280061	MICRO PROCESSOR CHIP	MOTOROLA	MC 6800L	1
M54	270023	QUAD 2 I/P NAND GATE	NATIONAL	7437	1
M55	270054	QUAD 2 I/P AND GATE	"	74 LS 08	2
M56	270054	" " " "	"	"	–
M57	270057	DUAL JK FLIP-FLOP	"	74 LS 76	1
M58	280009	HEX INVERTER/BUFFER	MOTOROLA	MC 14049	2
M59	280009	HEX INVERTER/BUFFER	MOTOROLA	MC 14049	–
M60, M62	260031	VOLTAGE DETECTOR	INTERSIL	ICL 8211	2
M61	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	–
S1		NOT USED			–
S2		NOT USED			–
S3		NOT USED			–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS.												
E.C.O.												
DATE												
CHKD.												

DATE 13.12.82
DRAWN IL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1081 DIGITAL PCB ASSY.
DRAWING NUMBER 400526
SHEET 14 OF 16

[illegible]. 1304

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
L1	370004	100 μH R.F. CHOKE	SIGMA	SC10/100	1
	590004	SLEEVE – PTFE	HELLERMANN ELECTRIC	FE10	A/R
	590055	SLEEVE ∅1·0 SIL. RUBBER	" "	HIS CONT. BLACK	10mm
	540002	22 SWG. BTC WIRE			A/R
	920048-1	BUS STRIP	MEKTRON	M823 14 7.3F	1
	613018	4BA NYLON WASHER			2
	630098	COMPONENT CLIP	RICHCO	KKU-8	1
	606005	CLIP FOR 605002	ANTIFERENCE	RC 74	3
J1, J2, J4	605002	16 WAY D.I.L. LOW PROFILE SKT.	JERMYN OR ANTIFERENCE	A23-2001/Y OR ICN-163-S3	3
	605065	28 WAY D.I.L. " " "	AUGAT	328-AG39D	1
	605060	14 WAY D.I.L. SOCKET	ASTRALUX OR JERMYN	ICL 143-S3T	22
	605061	16 WAY D.I.L. SOCKET	" "	ICL 163-S6T	24
	605050	40 WAY D.I.L. SOCKET	AUGAT	340-AG39D	1
	605063	22 WAY D.I.L. SOCKET	AUGAT	322-AG39D	2
	605064	24 WAY D.I.L. SOCKET	"	324-AG39D	3
	605062	18 WAY D.I.L SOCKET	"	318-AG39D	2
JL3	604037	PROGRAMMING CLASS 160 PLUG	"	8136-475G8	1
	605059	8 WAY D.I.L. SOCKET	ASTRALUX	ICL-083-S6T	1
J5	605052	8 WAY POLARISED SOCKET	"	22-01-2085	1
	617010	NYLATCH PLUNGER	ORDER FROM GJ FOX & SONS	HN3P-32-4-1	8
	617011	NYLATCH GROMMET	" " " "	HN3G-32-1	8
J3	605102	24 WAY D.I.L SOCKET.GOLD	CA	CA-245-10SD	1
	410096-10	PCB			1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS.												
E.C.O.												
DATE												
CHKD.												

DATE 13.12.82
DRAWN IL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1081 DIGITAL PCB. ASSY.
DRAWING NUMBER 400526
SHEET 15 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D1	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	10
D2	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D3	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D4	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D5	200008	200mA 125v LL Si DIODE	FAIRCHILD	IN458A	1
D6	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	1
D7		NOT USED			–
D8		NOT USED			–
D9		NOT USED			–
D10	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D11	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D12	200002	1A. 50v. GP. Si. DIODE	FAIRCHILD	IN4001	2
D13	213006	5V 5W ZENER	UNITRODE	TVS 505	1
D14	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D15	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–
D16	200002	1A. 50v. GP. Si. DIODE	FAIRCHILD	IN4001	–
D17	200001	Si GP. DIODE	FAIRCHILD	IN4148	–
D18		NOT USED			–
D19		NOT USED			–
D20		NOT USED			–
D21	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS												
ECO												
DATE												
CHKD												

DATE 13.12.82
DRAWN JL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1081 DIGITAL PCB. ASSY.

DRAWING NUMBER 400526

SHEET 10 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q1	240001	Si NPN TRANSISTOR	NATIONAL	BC184	3
Q2	240001	" " "	"	"	–
Q3	240007	" " "	"	2N3646	2
Q4		NOT USED			–
Q5	240006	Si NPN TRANSISTOR	NATIONAL	2N3904	3
Q6	250004	Si PNP "	"	2N3906	3
Q7	250004	" " "	"	"	–
Q8		NOT USED			–
Q9		NOT USED			–
Q10		NOT USED			–
Q11	240006	Si NPN TRANSISTOR	NATIONAL	2N3904	–
Q12	250011	" PNP "	"	BC327	1
Q13	240007	" NPN "	"	2N3646	–
Q14	240001	" " "	"	BC184	–
Q15	240006	" " "	"	2N3904	–
Q16	250004	" PNP "	"	2N3906	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS												
ECO												
DATE												
CHKD												

DATE 13.12.82
DRAWN JL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1081 DIGITAL PCB. ASSY.

DRAWING NUMBER 400526

SHEET 11 OF 16

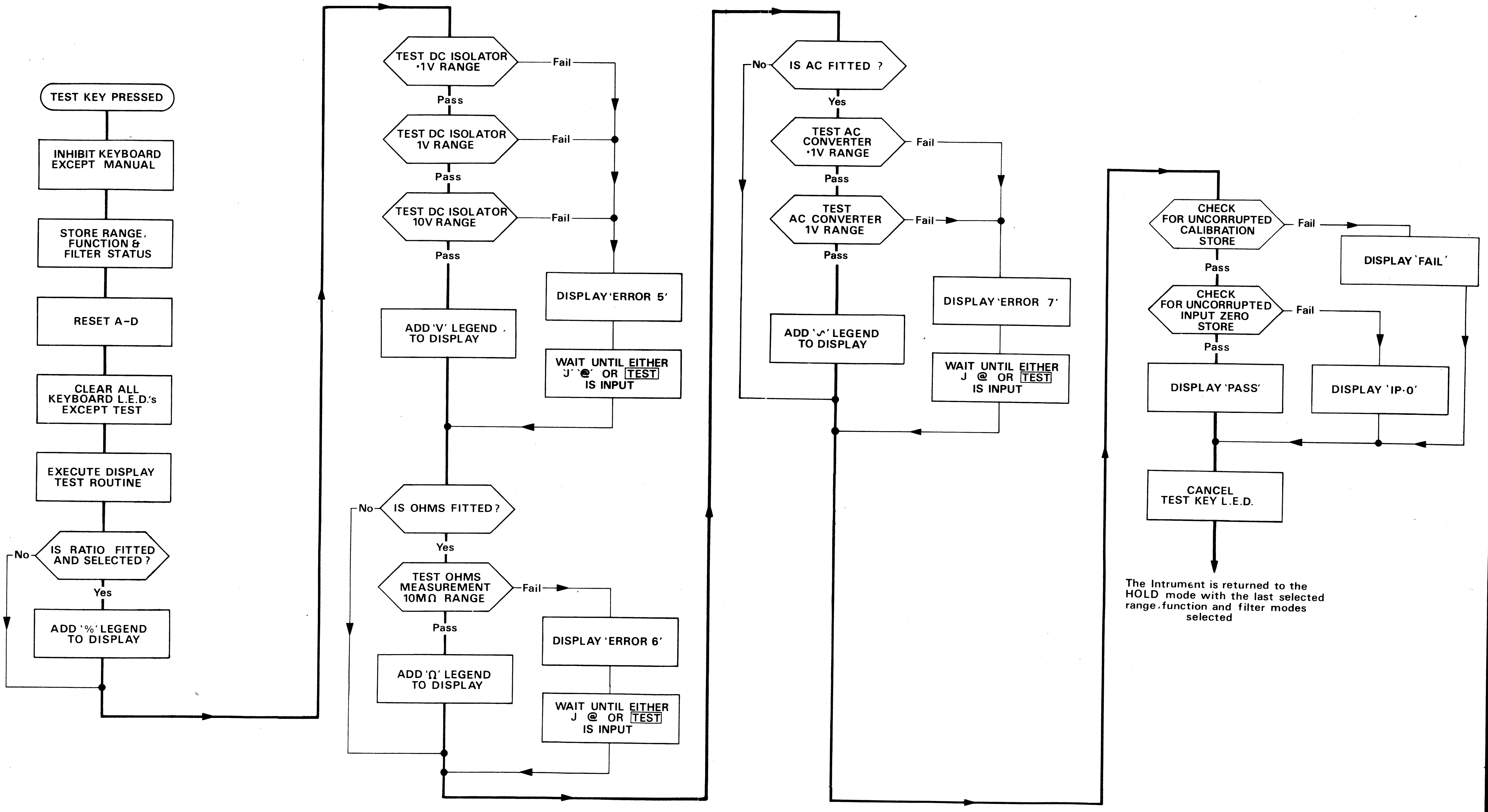

TEST KEY PRESSED
INHIBIT KEYBOARD EXCEPT MANUAL
STORE RANGE, FUNCTION & FILTER STATUS
RESET A-D
CLEAR ALL KEYBOARD L.E.D.'s EXCEPT TEST
EXECUTE DISPLAY TEST ROUTINE
IS RATIO FITTED AND SELECTED ?
No
Yes
ADD '%' LEGEND TO DISPLAY
TEST DC ISOLATOR ·1V RANGE
Fail
Pass
TEST DC ISOLATOR 1V RANGE
Fail
Pass
TEST DC ISOLATOR 10V RANGE
Fail
Pass
DISPLAY 'ERROR 5'
ADD 'V' LEGEND TO DISPLAY
WAIT UNTIL EITHER 'J' '@' OR TEST IS INPUT
IS OHMS FITTED ?
No
Yes
TEST OHMS MEASUREMENT 10MΩ RANGE
Fail
Pass
DISPLAY 'ERROR 6'
ADD 'Ω' LEGEND TO DISPLAY
WAIT UNTIL EITHER J @ OR TEST IS INPUT
IS AC FITTED ?
No
Yes
TEST AC CONVERTER ·1V RANGE
Fail
Pass
TEST AC CONVERTER 1V RANGE
Fail
Pass
ADD '∿' LEGEND TO DISPLAY
DISPLAY 'ERROR 7'
WAIT UNTIL EITHER J @ OR TEST IS INPUT
CHECK FOR UNCORRUPTED CALIBRATION STORE
Fail
Pass
DISPLAY 'FAIL'
CHECK FOR UNCORRUPTED INPUT ZERO STORE
Fail
Pass
DISPLAY 'PASS'
DISPLAY 'IP·0'
CANCEL TEST KEY L.E.D.
The Intrument is returned to the HOLD mode with the last selected range, function and filter modes selected

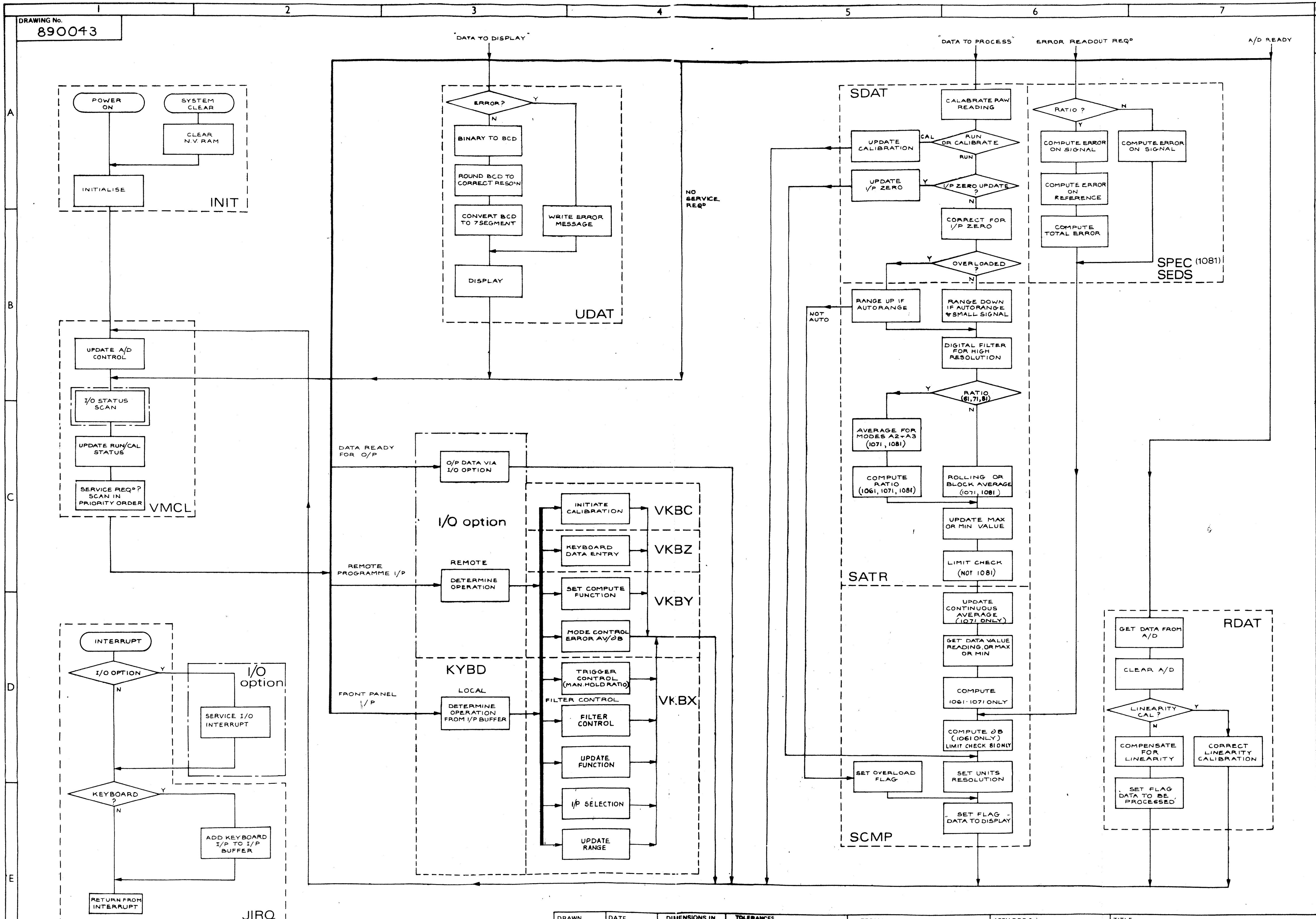
Fig. 3.52 FLOWCHART OF SELF-TEST ROUTINE

SELF-TEST FLOWCHART & ERROR #5

DRAWING No.
890043

ISS.	CHANGES
12	ECO 1267 6½ DIGIT MOD AND GENERAL UPDATE. JR 9.2.82

MASTER FLOW DIAGRAM



1
2
3
4
5
6
7
A
B
C
D
E
"DATA TO DISPLAY"
"DATA TO PROCESS"
ERROR READOUT REQ°
A/D READY
POWER ON
SYSTEM CLEAR
CLEAR N.V. RAM
INITIALISE
INIT
ERROR ?
Y
N
BINARY TO BCD
ROUND BCD TO CORRECT RESO^N
CONVERT BCD TO 7SEGMENT
WRITE ERROR MESSAGE
DISPLAY
UDAT
NO SERVICE REQ°
UPDATE A/D CONTROL
I/O STATUS SCAN
UPDATE RUN/CAL STATUS
SERVICE REQ°? SCAN IN PRIORITY ORDER
VMCL
DATA READY FOR O/P
O/P DATA VIA I/O OPTION
I/O option
REMOTE PROGRAMME I/P
REMOTE
DETERMINE OPERATION
KYBD
LOCAL
FRONT PANEL I/P
DETERMINE OPERATION FROM I/P BUFFER
INITIATE CALIBRATION
VKBC
KEYBOARD DATA ENTRY
VKBZ
SET COMPUTE FUNCTION
VKBY
MODE CONTROL ERROR AV/∂B
TRIGGER CONTROL (MAN.HOLD RATIO)
FILTER CONTROL
VKBX
FILTER CONTROL
UPDATE FUNCTION
I/P SELECTION
UPDATE RANGE
INTERRUPT
I/O OPTION
Y
N
I/O option
SERVICE I/O INTERRUPT
KEYBOARD ?
Y
N
ADD KEYBOARD I/P TO I/P BUFFER
RETURN FROM INTERRUPT
JIRQ
SDAT
CALABRATE RAW READING
RUN OR CALIBRATE
CAL
RUN
UPDATE CALIBRATION
I/P ZERO UPDATE ?
Y
N
UPDATE I/P ZERO
CORRECT FOR I/P ZERO
OVERLOADED ?
Y
N
RANGE UP IF AUTORANGE
NOT AUTO
RANGE DOWN IF AUTORANGE & SMALL SIGNAL
DIGITAL FILTER FOR HIGH RESOLUTION
RATIO (61,71,81)
Y
N
AVERAGE FOR MODES A2+A3 (1071, 1081)
COMPUTE RATIO (1061, 1071, 1081)
ROLLING OR BLOCK AVERAGE (1071, 1081)
UPDATE MAX OR MIN VALUE
LIMIT CHECK (NOT 1081)
SATR
UPDATE CONTINUOUS AVERAGE (1071 ONLY)
GET DATA VALUE READING, OR MAX OR MIN
COMPUTE 1061-1071 ONLY
COMPUTE ∂B (1061 ONLY) LIMIT CHECK 81 ONLY
SET OVERLOAD FLAG
SET UNITS RESOLUTION
" SET FLAG " DATA TO DISPLAY
SCMP
RATIO ?
Y
N
COMPUTE ERROR ON SIGNAL
COMPUTE ERROR ON SIGNAL
COMPUTE ERROR ON REFERENCE
COMPUTE TOTAL ERROR
SPEC (1081)
SEDS
RDAT
GET DATA FROM A/D
CLEAR A/D
LINEARITY CAL ?
Y
N
COMPENSATE FOR LINEARITY
CORRECT LINEARITY CALIBRATION
SET FLAG 'DATA TO BE PROCESSED'

datron
ELECTRONICS
LIMITED
NORWICH

DRAWN	DATE	DIMENSIONS IN MILLIMETRES	TOLERANCES	MATERIAL	ASSY DRG &	TITLE	DRAWING No.
JR	12-1-82		DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm ANGULAR ± ½°	—	PARTS LIST	MASTER PROGRAM SOURCE	890043
CHECKED	DATE	SCALE		FINISH	CIRCUIT DIAGRAM		
G.B.	9-2-82		UNLESS OTHERWISE STATED	—	CHECK PROCEDURE		
APPR.	DATE	NOT TO BE SCALED	FIRST ANGLE PROJECTION		CHECK LIST		SHEET 1 OF 27

E.B.W.

DRAWING No. 430301

FIRST USED ON 1071

THIRD ANGLE PROJECTION

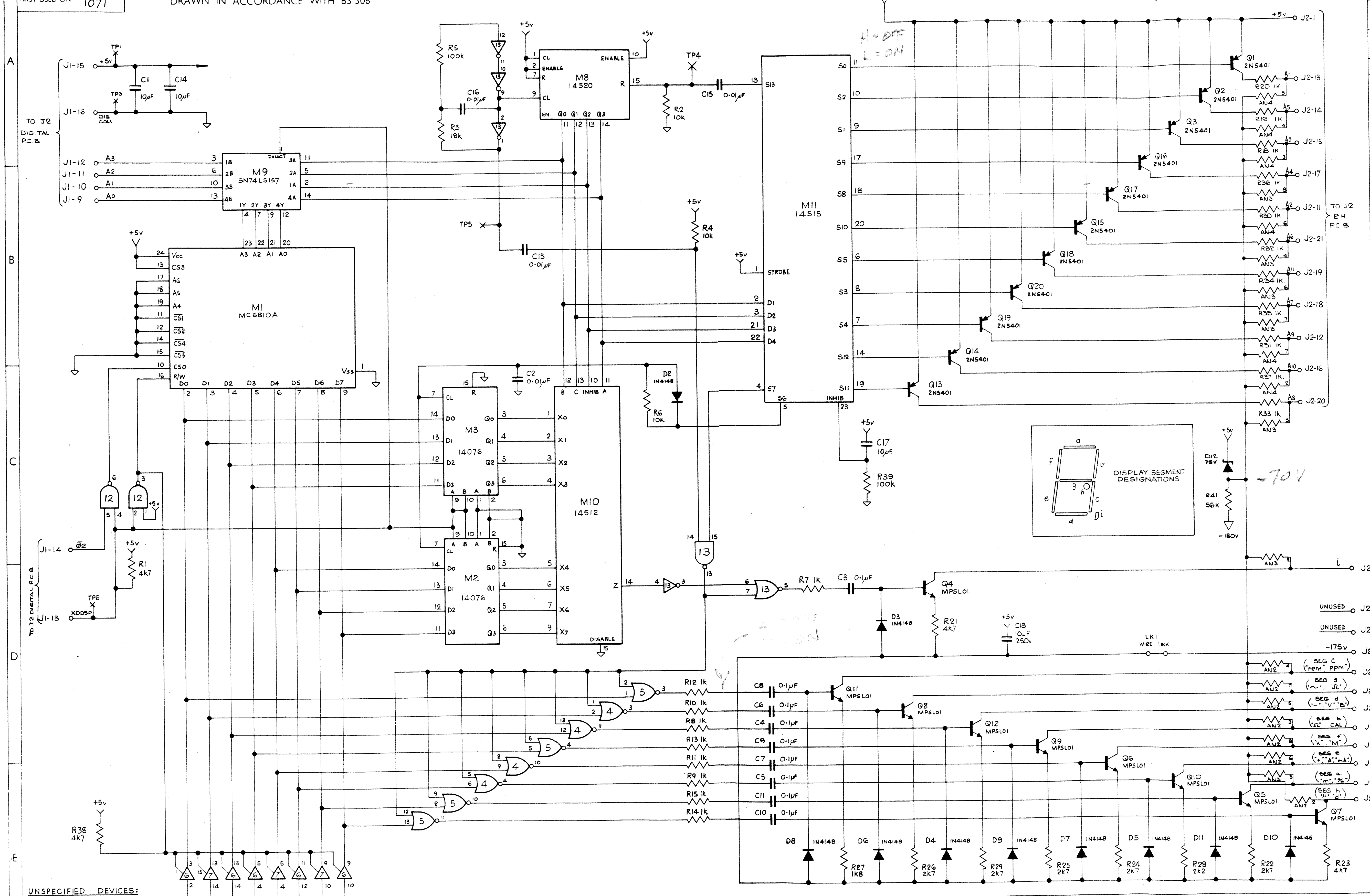
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED TO PRODUCTION 30-10-78
2	C18 ADDED & R40. ECO 789. 17 NOV 78. W.G.S.
3	AN2-AN4 ADDED R41 & D12 ADDED E.C.O 822 19-FEB 79 W.G.S
4	R40 WAS 180Ω 000181 NOW WIRE LINK. E.C.O 854 8 MAY 79. W.G.S.
5	ECO 1025. D12 WAS 82V B.J. 1-3-80.

DISPLAY DRIVER



A
B
C
D
E
1
2
3
4
5
6
7
J1-15
J1-16
TP1
TP3
+5v
C1 10μF
C14 10μF
DIG COM
TO J2 DIGITAL P.C.B
J1-12 A3
J1-11 A2
J1-10 A1
J1-9 A0
M9 SN74LS157
SELECT
1Y 2Y 3Y 4Y
M1 MC6810A
Vcc
CS3
A6
A5
A4
CS1
CS2
CS4
CS5
CS0
R/W
D0 D1 D2 D3 D4 D5 D6 D7
Vss
A3 A2 A1 A0
R5 100k
R3 18k
C16 0·01μF
M8 14520
CL
ENABLE
R
EN. Q0 Q1 Q2 Q3
TP4
R2 10k
C15 0·01μF
TP5
C13 0·01μF
R4 10k
H = OFF
L = ON
M11 14515
STROBE
D1 D2 D3 D4
S0 S2 S1 S9 S8 S10 S5 S3 S4 S12 S11
S7 S6
INHIB
C17 10μF
R39 100k
Q1 2N5401
Q2 2N5401
Q3 2N5401
Q16 2N5401
Q17 2N5401
Q15 2N5401
Q18 2N5401
Q20 2N5401
Q19 2N5401
Q14 2N5401
Q13 2N5401
R20 1K
R19 1K
R18 1K
R36 1K
R30 1K
R32 1K
R34 1K
R35 1K
R31 1K
R37 1K
R33 1K
AN4
AN3
J2-1
J2-13
J2-14
J2-15
J2-17
J2-11
J2-21
J2-19
J2-18
J2-12
J2-16
J2-20
TO J2 R.H. P.C.B
DISPLAY SEGMENT DESIGNATIONS
a b c d e F g h Di
D12 75V
R41 56K
-180v
-70V
M3 14076
M2 14076
M10 14512
B C INHIB A
X0 X1 X2 X3 X4 X5 X6 X7
DISABLE
Z
C2 0·01μF
D2 1N4148
R6 10k
J1-14 Ø2
J1-13 XDDSP
TP6
R1 4K7
TO J2 DIGITAL P.C.B
R7 1k
C3 0·1μF
Q4 MPSL01
D3 1N4148
R21 4K7
C18 10μF 250v
LK1 WIRE LINK
i J2-23
UNUSED J2-9
UNUSED J2-10
-175v J2-24
J2-4
J2-7
J2-5
J2-3
J2-8
J2-6
J2-22
J2-2
SEG C ("rem" "ppm")
SEG g ("−" "Ω")
SEG d ("−" "V" "B")
SEG b ("Ω" "CAL")
SEG F ("k" "M")
SEG e ("+" "A" "mA")
SEG a ("m" "%")
SEG h ("M" "d")
AN2
TO J2 R.H P.C.B
R12 1k
R10 1k
R8 1k
R13 1k
R11 1k
R9 1k
R15 1k
R14 1k
C8 0·1μF
C6 0·1μF
C4 0·1μF
C9 0·1μF
C7 0·1μF
C5 0·1μF
C11 0·1μF
C10 0·1μF
Q11 MPSL01
Q8 MPSL01
Q12 MPSL01
Q9 MPSL01
Q6 MPSL01
Q10 MPSL01
Q5 MPSL01
Q7 MPSL01
D8 1N4148
D6 1N4148
D4 1N4148
D9 1N4148
D7 1N4148
D5 1N4148
D11 1N4148
D10 1N4148
R27 1K8
R26 2K7
R29 2K7
R25 2K7
R24 2K7
R28 2K2
R22 2K7
R23 4K7
R38 4K7
D0 D1 D2 D3 D4 D5 D6 D7
J1-1 J1-2 J1-3 J1-4 J1-5 J1-6 J1-7 J1-8
TO J2 DIGITAL PC BOARD

UNSPECIFIED DEVICES:

M13 = MC14572.

M4, M5 = MC14001BCP

M6, M7 = MC14503BCP

M12 = SN74LS00

R1 – R37 = 5% ¼W CARBON

C1, C15 = 20% 25v DIP TANT.

C2 – C14, C16 = 10% 250v POLYESTER

I.L	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	ANGULAR ± °
	APPROVED	SCALE		
DATE 30. 10. 78	DATE	NOT TO BE SCALED		

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE DISPLAY DRIVER PCB 1071/1081

DRAWING SIZE A1

DRAWING No. 430301

SHEET 1 OF 1

DRAWING No. 400301

FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

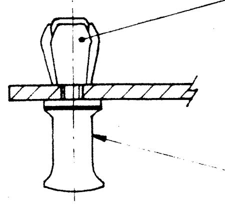
ALL BURRS TO BE REMOVED

NOTES

1. MAKE TP1-TP6 FROM 22 SWG. BTC. WIRE – PART Nº 540002.

ISS.	CHANGES
C	
1	RELEASED TO PRODUCTION 29.9.78
2	C18 ADDED & R40 E.C.O 789. 17 NOV 78 W.G.S
3	R41 ADDED AN2-AN4 & D12 ADDED ECO 822 19 FEB 79 W.G.S
4	R40 WAS 180Ω 000181 NOW WIRE LINK E.C.O 854 8 MAY 79. W.G.S.
5	CLIP FOR J1 WAS 606005. ECO.904 21.6.79 IL
6	ECO 1000 & 1025 RIBBON CABLE CLIP WAS 606007. B.J. D12 WAS 8.2V. 5.1.80
7	ECO 1217 J1 WAS 16 WAY SOCKET JR 17.8.81
8	ECO 1253 PARTS LIST CHANGE. To J2 JR 2.12.81

DISPLAY DRIVER PCB

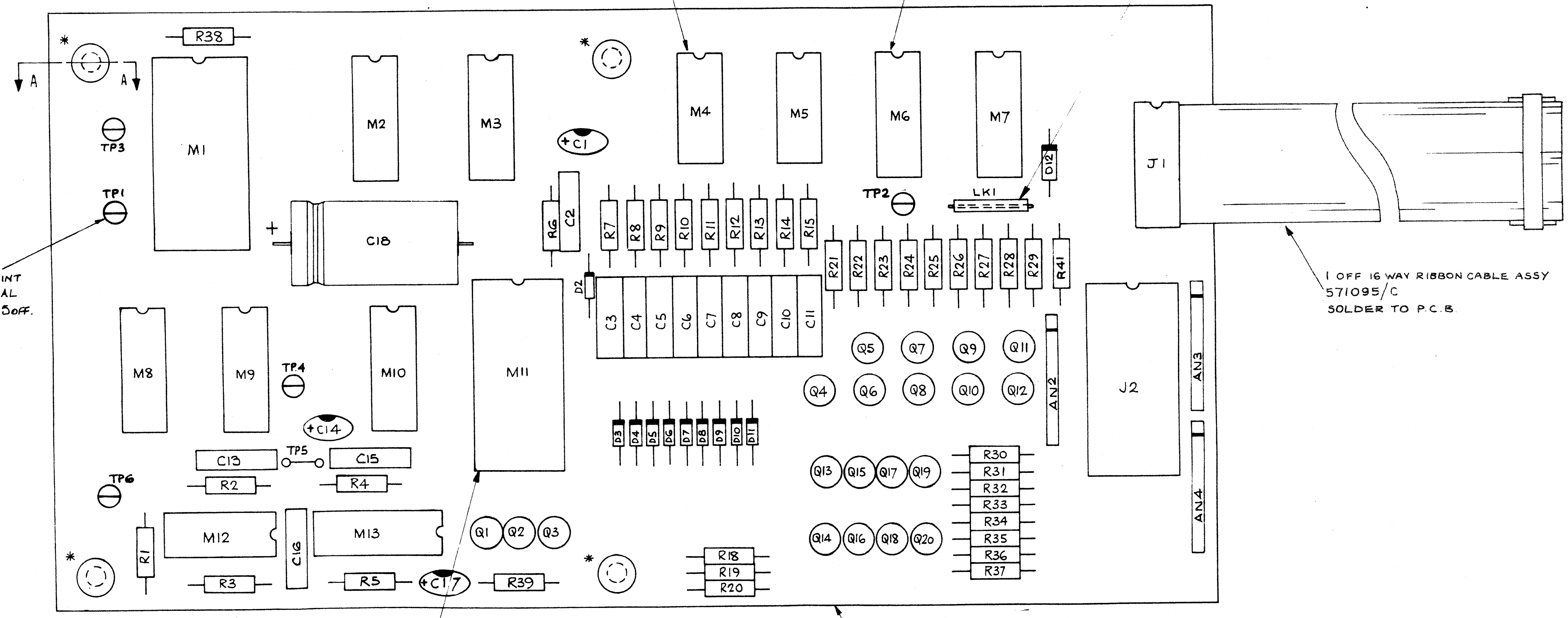


* NYLATCH- GROMMET 617011 - 4 OFF

* NYLATCH - PLUNGER 617010 - 4 OFF

N.B. FIT FROM COMPONENT SIDE OF PCB.

SECTION A-A


*
A
A
R38
M1
TP3
TP1
C18
+
M2
M3
+C1
R6
C2
R7
R8
R9
R10
R11
R12
R13
R14
R15
M4
M5
M6
M7
TP2
LK1
D12
J1
R21
R22
R23
R24
R25
R26
R27
R28
R29
R41
D2
C3
C4
C5
C6
C7
C8
C9
C10
C11
M8
M9
TP4
M10
M11
+C14
TP5
C13
C15
R2
R4
TP6
Q5
Q7
Q9
Q11
Q4
Q6
Q8
Q10
Q12
AN2
AN3
J2
D3
D4
D5
D6
D7
D8
D9
D10
D11
Q13
Q15
Q17
Q19
Q14
Q16
Q18
Q20
R30
R31
R32
R33
R34
R35
R36
R37
AN4
M12
M13
R1
C16
Q1
Q2
Q3
R3
R5
+C17
R39
R18
R19
R20

MOUNT M4, M5, M12 ON 14 WAY DIL SOCKET 605060 - 3 OFF

MOUNT ALL OTHER ICs ON 16 WAY DIL SOCKET 605061 - 8 OFF

WIRE LINK 540002 SLEEVED 590004

TEST POINT TERMINAL 620007 5 OFF.

1 OFF 16 WAY RIBBON CABLE ASSY 571095/C SOLDER TO P.C.B

MOUNT M1 & M11 ON 24 WAY SOCKETS 605064 - 2 OFF

PCB 410097-5A

DRAWN IL.	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± 005 DECIMAL TO 2 PLACES ± 010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm UNLESS OTHERWISE STATED
TRACED	APPROVED	SCALE 2:1	
DATE 3.5.78	DATE	NOT TO BE SCALED	

J.W.1162

MATERIAL SEE PARTS LIST

FINISH ________

datron ELECTRONICS LTD. NORWICH.

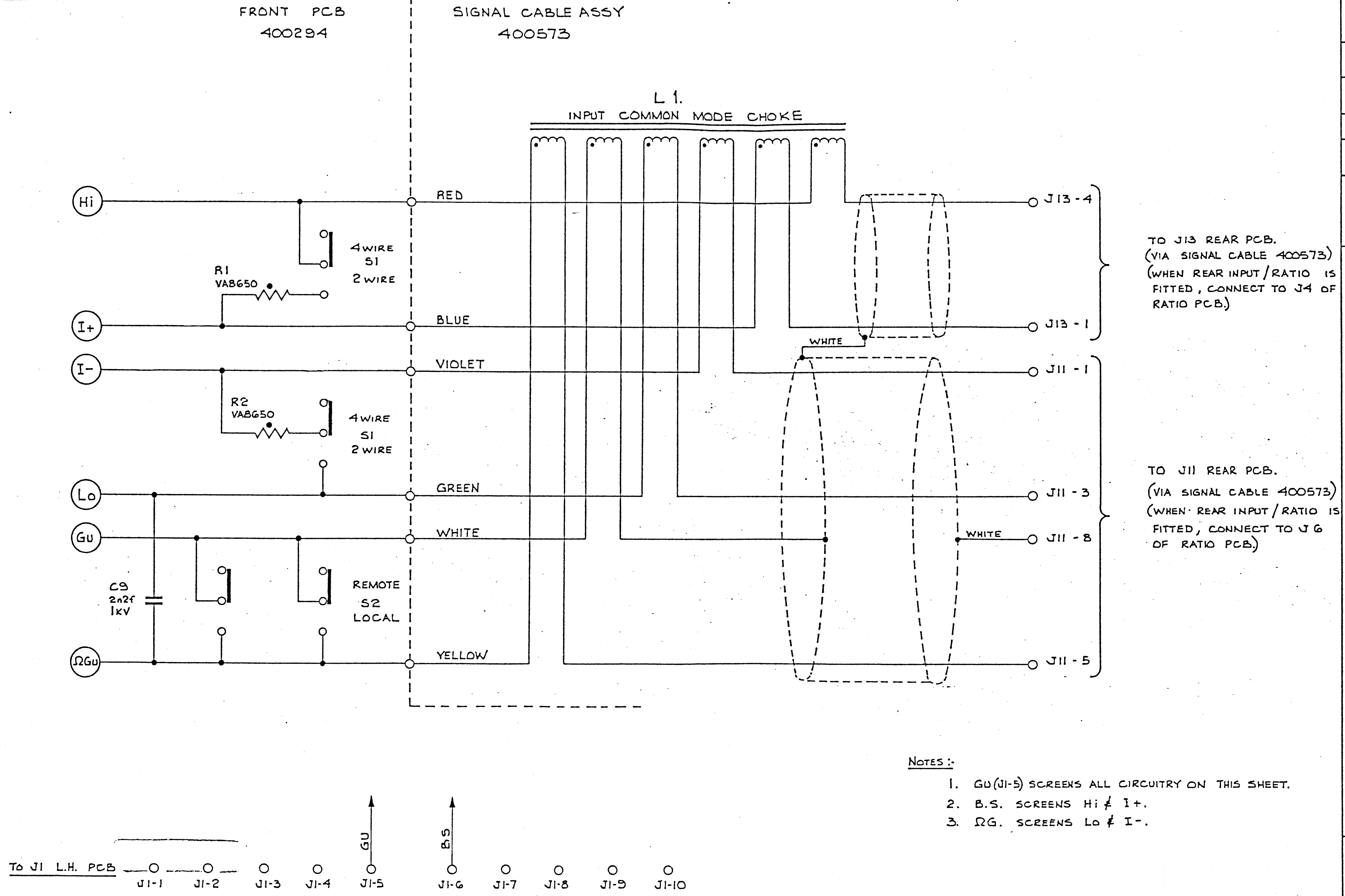
TITLE DISPLAY DRIVER PCB. ASSY. 1071/1081

DRAWING SIZE A2

DRAWING No. 400301-

SHEET 1 OF 7

DRAWING No.
430294


FRONT PCB
400294
SIGNAL CABLE ASSY
400573
L 1.
INPUT COMMON MODE CHOKE
Hi
I+
I-
Lo
Gu
ΩGu
RED
BLUE
VIOLET
GREEN
WHITE
YELLOW
R1
VA8650
R2
VA8650
4 WIRE
S1
2 WIRE
4 WIRE
S1
2 WIRE
C9
2n2f
1kV
REMOTE
S2
LOCAL
WHITE
WHITE
J13 - 4
J13 - 1
J11 - 1
J11 - 3
J11 - 8
J11 - 5
TO J13 REAR PCB.
(VIA SIGNAL CABLE 400573)
(WHEN REAR INPUT / RATIO IS FITTED, CONNECT TO J4 OF RATIO PCB.)
TO J11 REAR PCB.
(VIA SIGNAL CABLE 400573)
(WHEN REAR INPUT / RATIO IS FITTED, CONNECT TO J 6 OF RATIO PCB.)
GU
B.S
To J1 L.H. PCB
J1-1
J1-2
J1-3
J1-4
J1-5
J1-6
J1-7
J1-8
J1-9
J1-10

NOTES :-

1. GU (J1-5) SCREENS ALL CIRCUITRY ON THIS SHEET.
2. B.S. SCREENS Hi & I+.
3. ΩG. SCREENS Lo & I-.

ISS.	CHANGES
2	REDRAWN BJ 21.3.79.
3	ECO 899 SCREEN FOR Hi & I+ NOW CONNECTED TO GU. VIA WHITE WIRE BJ 11-6-79
4	ECO 1111 C9 ADDED. IL 21.4.80
5	ECO 1472 C10 ADDED (4n7f) IL 2.6.83.
6	ECO 1662 SEE SHEET. 1.
7	ECO 1661 C10 DELETED AP. 10.9.84.
8	ECO 1823 BJ. RE-DRAWN. 25-1-85 CABLE ASSY ADDED TO FRONT PCB ASSY. CHOKE ADDED TO SIGNAL CABLE.

FRONT PCB CKTS 1

datron
INSTRUMENTS
NORWICH
ENGLAND

THIRD ANGLE PROJECTION
ALL BURRS TO BE REMOVED

DRAWN B.S.JACKSON
DATE 24th JAN 85
CHECKED MJD.
DATE 29.1.85
APPR B Hume
DATE 29.1.85

DIMENSIONS IN MILLIMETRES
SCALE —
NOT TO BE SCALED

TOLERANCES
DECIMAL TO 2 PLACES ±·1mm
DECIMAL TO 1 PLACE ±·2mm
WHOLE DIMENSIONS ±·4mm
ANGULAR ± ½°
UNLESS OTHERWISE STATED

MATERIAL —
FINISH —

ASSY DRG & PARTS LIST 400294
CIRCUIT DIAGRAM 430294
CHECK PROCEDURE 460294
CHECK LIST 470294

TITLE
FRONT PCB CIRCUIT DIAGRAM

DRAWING No.
430294.

SHEET 2 OF 2

FRONT PCB CKT

DRAWING No	
430294	
FIRST USED ON	1061/71

THIRD ANGLE PROJECTION

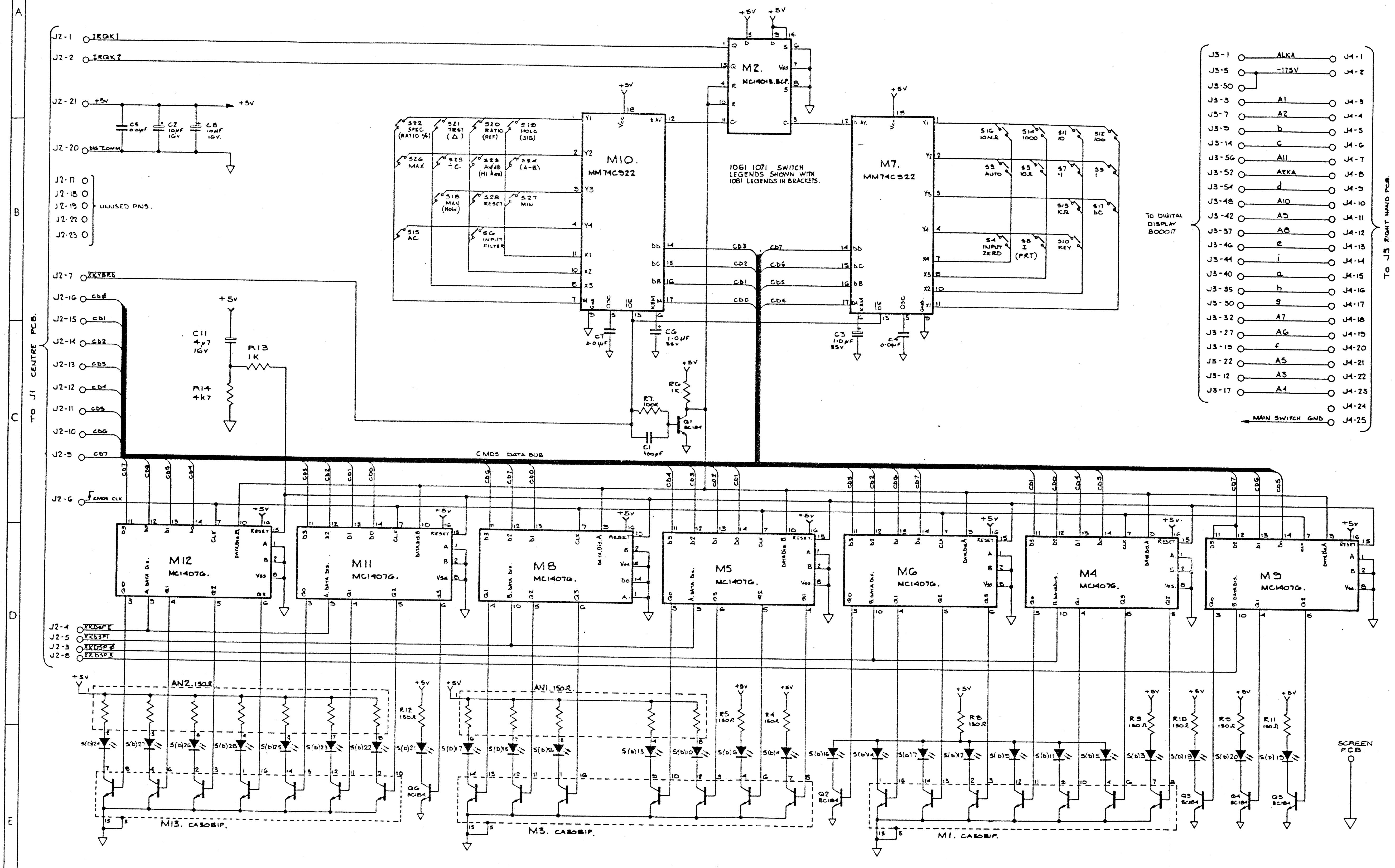
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. SIGNAL CD1 ON J2-15, THERE IS A LINK 'LK2' IN THIS SIGNAL LINE.

ISS.	CHANGES
2	REDRAWN. B.J. 21-3-79
3	ECO ~~[illegible]~~ 869 CHANGE ON SHT 2. BJ. 11-6-79
4	ECO 1111 SEE SHEET 2 IL 21.4.80
5	ECO 1472 C10 ADDED (4n7F) IL 2.6.83
6	ECO 1662 R13, R14, C11 AND SCREEN PCB ADDED. ON M4, 5, 6, 8, 9, 11 AND M12 PIN 15 WENT TO ▽, AND PIN 16 WAS N.C. M2 PIN 14 WAS N.C. JP 7.8.84
7	ECO 1661 SEE SHT 2 RP 10.9.84
8	ECO 1823. SEE SHEET. 2. BJ. 24th JAN 85.


1
2
3
4
5
6
7
A
B
C
D
E
J2-1 IRQK1
J2-2 IRQK2
J2-21 +5V
J2-20 DIG COMM
C5 0.01µF
C2 10µF 16V
C8 10µF 16V
J2-17
J2-18
J2-19
J2-22
J2-23
UNUSED PINS.
J2-7 KYBRD
J2-16 CD0
J2-15 CD1
J2-14 CD2
J2-13 CD3
J2-12 CD4
J2-11 CD5
J2-10 CD6
J2-9 CD7
J2-6 CMOS CLK
TO J1 CENTRE PCB.
J2-4 KDSP2
J2-5 KDSP1
J2-3 KDSP0
J2-8 KDSP3
+5V
C11 4µ7 16V
R13 1K
R14 4k7
R7 100K
R6 1K
Q1 BC184
C1 100pF
C7 0.01µF
C6 1.0µF 35V
C3 1.0µF 35V
C4 0.01µF
M2. MC14013BCP.
M10. MM74C922
M7. MM74C922
1061 1071 SWITCH LEGENDS SHOWN WITH 1081 LEGENDS IN BRACKETS.
S22 SPEC (RATIO %)
S21 TEST (Δ)
S20 RATIO (REF)
S19 HOLD (SIG)
S26 MAX
S25 ÷C
S23 AV/dB (Hi Res)
S24 (A-B)
S18 MAN (Hold)
S28 RESET
S27 MIN
S15 AC
S6 INPUT FILTER
S16 10MΩ
S14 1000
S11 10
S12 100
S3 AUTO
S5 10Ω
S7 ÷1
S9 1
S13 KΩ
S17 DC
S4 INPUT ZERO
S8 Σ (PRT)
S10 KEY
CD0 CD1 CD2 CD3 CD4 CD5 CD6 CD7
CMOS DATA BUS
M12 MC14076.
M11 MC14076.
M8 MC14076.
M5 MC14076.
M6 MC14076.
M4 MC14076.
M9 MC14076.
J3-1 ALKA J4-1
J3-5 -175V J4-2
J3-50
J3-3 A1 J4-3
J3-7 A2 J4-4
J3-9 b J4-5
J3-14 c J4-6
J3-56 A11 J4-7
J3-52 ARKA J4-8
J3-54 d J4-9
J3-48 A10 J4-10
J3-42 A9 J4-11
J3-37 A8 J4-12
J3-46 e J4-13
J3-44 i J4-14
J3-40 a J4-15
J3-35 h J4-16
J3-30 g J4-17
J3-32 A7 J4-18
J3-27 A6 J4-19
J3-19 f J4-20
J3-22 A5 J4-21
J3-12 A3 J4-22
J3-17 A4 J4-23
J4-24
MAIN SWITCH GND. J4-25
TO DIGITAL DISPLAY 800017
TO J3 RIGHT HAND PCB.
AN2. 150Ω
AN1. 150Ω
R12 150Ω
R5 150Ω
R4 150Ω
R8 150Ω
R3 150Ω
R10 150Ω
R9 150Ω
R11 150Ω
S(b)24 S(b)27 S(b)26 S(b)28 S(b)25 S(b)23 S(b)22 S(b)21
S(b)7 S(b)5 S(b)8 S(b)13 S(b)10 S(b)6 S(b)4
S(b)16 S(b)4 S(b)17 S(b)12 S(b)3 S(b)11 S(b)15 S(b)13 S(b)18 S(b)20 S(b)19
Q6 BC184
Q2 BC184
Q3 BC184
Q4 BC184
Q5 BC184
M13. CA3081P.
M3. CA3081P.
M1. CA3081P.
SCREEN PCB

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
BJ.	P.R.H.	MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64; ANGULAR ±	——
TRACED	APPROVED	SCALE ——	METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	FINISH ——
DATE 21-3-79	DATE	NOT TO BE SCALED		

datron ELECTRONICS LTD. NORWICH.

TITLE FRONT P.C.B. CIRCUIT DIAGRAM 1061/1071/1081

DRAWING No. 430294

DRAWING SIZE A1

SHEET 1 OF 2

FRONT PCB CKTS 2

FRONT PCB

DRAWING No 400294.
FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

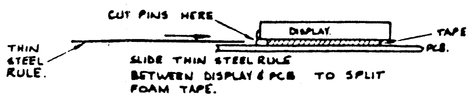
ALL BURRS TO BE REMOVED

NOTES

IMPORTANT.

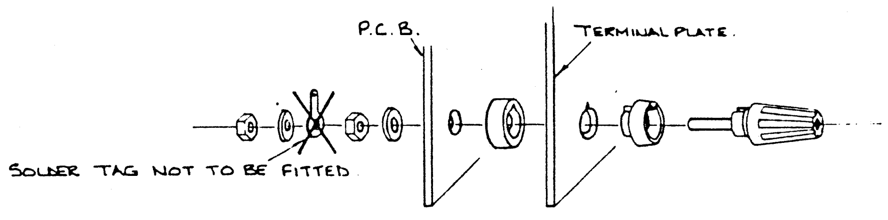
1. FIT M1 3 4 5 6 8 9 11 12 & 13 INTO 16 WAY AUGAT SOCKET PART NO 605061.
FIT M7 & M10 INTO AUGAT SOCKET PART NO. 605062. 18 WAY.
FIT M2 INTO AUGAT SOCKET PART No. 605060. 14 WAY.

2. TO REMOVE DISPLAY:-

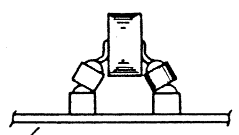

CUT PINS HERE
DISPLAY.
TAPE
PCB.
THIN STEEL RULE.

SLIDE THIN STEEL RULE BETWEEN DISPLAY & PCB TO SPLIT FOAM TAPE.

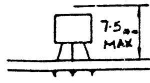
ISS	CHANGES
C	-
D	UPDATED PCB REMOVED S29.
1	RELEASED TO PRODN 29-9-78
2	SKETCH FOR HOLTITE SOCKETS ADDED. BJ. ECO 778 5-12-78
3	ECO 816 WARNING LABEL 420080-1 ADDED ECO 816 C3 &C4 WERE 0.33uF (650010) 25 JAN 79 W G S
4	ECO 867. LK3 ADDED. BJ. 11 JUN 79.
5	ECO 988. 26-10-79 UPDATED PCB. BJ. + 2 PIECES OF 630029. DELETED SOCKETS:- 602011 & 602012 DISPLAY REMOVAL NOTE
6	ECO.1111 C9 ADDED. IL 21 4 80
7	ECO 1213 LK3 DELETED JR 11·6·81
8	ECO 1352 MORE TAPE ADDED TO REVERSE OF DISPLAY. JR 1·7·82
9	ECO 1472 C10 ADDED COMPLETE WITH SOLDER TAG. ENDS IL 2.6.82
10	ECO 1662 PCB WAS ISS. 4C R13, R14 C11 AND SCREEN P.C.B ADDED. C9 NOW TRACKED IN. JR 6 8 84
11	ECO 1661 C10 & 48A TAG DELETED RP. 10.9.84
	CONT.
12	ECO 1815 SCREEN P.C.B REMOVED. JR 10.1.85
13	ECO 1823. BJ. SIGNAL CABLE ASSY ADDED. 24th JAN 85.


P.C.B.
TERMINAL PLATE.
SOLDER TAG NOT TO BE FITTED

ASSEMBLE 6 TERMINALS TO TERMINAL PLATE No 450179 & PCB AS SHOWN ABOVE. TERMINAL COLOURS MUST BE AS INDICATED BELOW.



RESISTORS R1 & R2
2 OFF INSULATING BEADS 630024 ASSEMBLED ON EACH LEG A SHOWN RESISTORS TO BE MOUNTED ON THE UNDER SIDE OF BOARD.



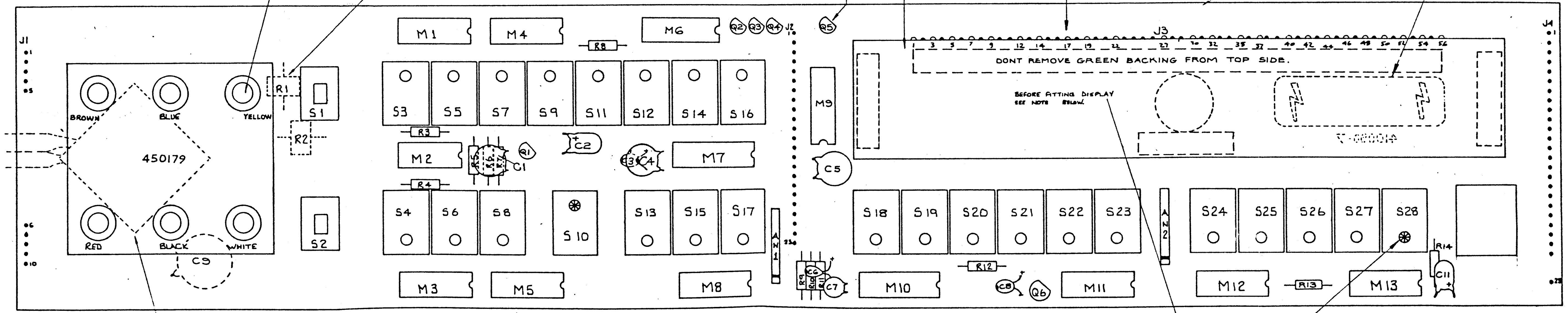
NOTE.
NO COMPONENTS TO STAND HIGHER THAN 7·5 mm (EXCEPT SWITCH'S & TERMINALS)
EXCEPT Q4 & Q5 WHICH MUST BE LESS THAN 6·5 mm

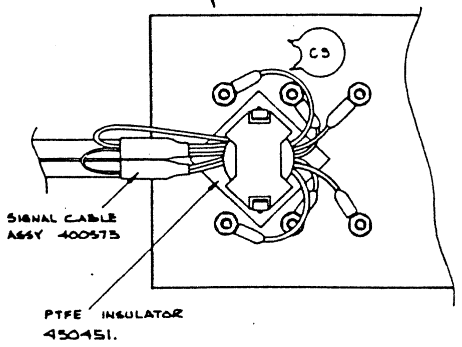
THE DISPLAY IS TO HAVE 7 PIECES OF PRESSURE SENSITIVE TAPE 630029. 1 PIECE (140 mm LONG) STUCK TO THE P.C.B. BELOW THE LINE OF HOLES AND 6 PIECES (25 mm LONG) STUCK TOGETHER IN PAIRS AND STUCK TO THE REVERSE OF DISPLAY IN POSITIONS SHOWN. LINE UP AND PRESS DISPLAY FIRMLY INTO PLACE. THEN SOLDER THE 24 PINS WHICH ARE SHOWN BELOW (THERE ARE ONLY SOLDER PADS FOR THESE PINS).

8½ DIGIT DISPLAY 800017

FIT WARNING LABEL 420080-1 IN APPROX POSITION SHOWN ON TRACK SIDE OF P.C.B. NEAR MAINS AND DISPLAY CONNECTIONS.

FRONT P.C.B. 410090-7


J1
1
5
6
10
BROWN
BLUE
YELLOW
450179
RED
BLACK
WHITE
C9
R1
S1
R2
S2
M1
M4
M6
R8
Q2
Q3
Q4
J2
Q5
S3
S5
S7
S9
S11
S12
S14
S16
R3
M2
R5
R6
R7
C1
Q1
C2
C3
C4
M7
M9
C5
R4
S4
S6
S8
S10
S13
S15
S17
AN1
23
M3
M5
M8
R9
R10
R11
C6
C7
J3
1 3 5 7 9 12 14 17 19 22 27 30 32 35 37 40 42 44 46 48 50 52 54 56
DONT REMOVE GREEN BACKING FROM TOP SIDE.
BEFORE FITTING DISPLAY SEE NOTE BELOW.
J4
1
S18
S19
S20
S21
S22
S23
AN2
S24
S25
S26
S27
S28
R14
R12
C8
Q6
M10
M11
M12
R13
M13
C11
25

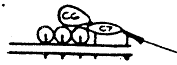

C9
SIGNAL CABLE ASSY 400573
PTFE INSULATOR 450451.

SOLDER SIGNAL CABLE ASSY 400573 TO REVERSE SIDE OF PCB WITH PTFE INSULATOR 450451 BETWEEN PCB & CHOKE.

CONNECT WIRES TO TERMINALS THUS :-

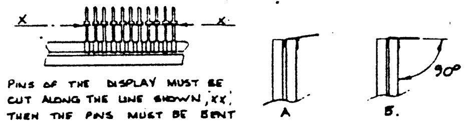
WHITE	WIRE	TO	WHITE	TERMINAL
YELLOW	"	"	YELLOW	"
GREEN	"	"	BLACK	"
RED	"	"	RED	"
VIOLET	"	"	BLUE	"
BLUE	"	"	BROWN	"

WHEN ASSEMBLY IS FINISHED TAPE CABLES TO PCB USING MASKING TAPE 630099.
DO NOT STICK MASKING TAPE OVER DISPLAY. !



ALL CAPACITORS TO BE LAID DOWN WHERE POSSIBLE, AS SHOWN. LEADS TO BE BENT AT RIGHT ANGLES THEN INSERTED INTO BOARD, THIS IS TO KEEP CAPACITORS AS LOW AS POSSIBLE.

GREEN L.E.D.s 2 OFF ALL OTHERS RED.



PINS OF THE DISPLAY MUST BE CUT ALONG THE LINE SHOWN, XX. THEN THE PINS MUST BE BENT FROM 'A' TO 'B' BEFORE INSERTION INTO PCB.

DRAWN B.J.	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	SCALE 2:1 NOT TO BE SCALED		FINISH	TITLE FRONT P.C.B. ASSY. 1061 / 1071 / 1081.	DRAWING No. 400294. SHEET 1 OF 6
DATE 19-4-78	DATE					

FRONT PCB 1

DRAWING No.	430295.
FIRST USED ON	1061/71.

THIRD ANGLE PROJECTION

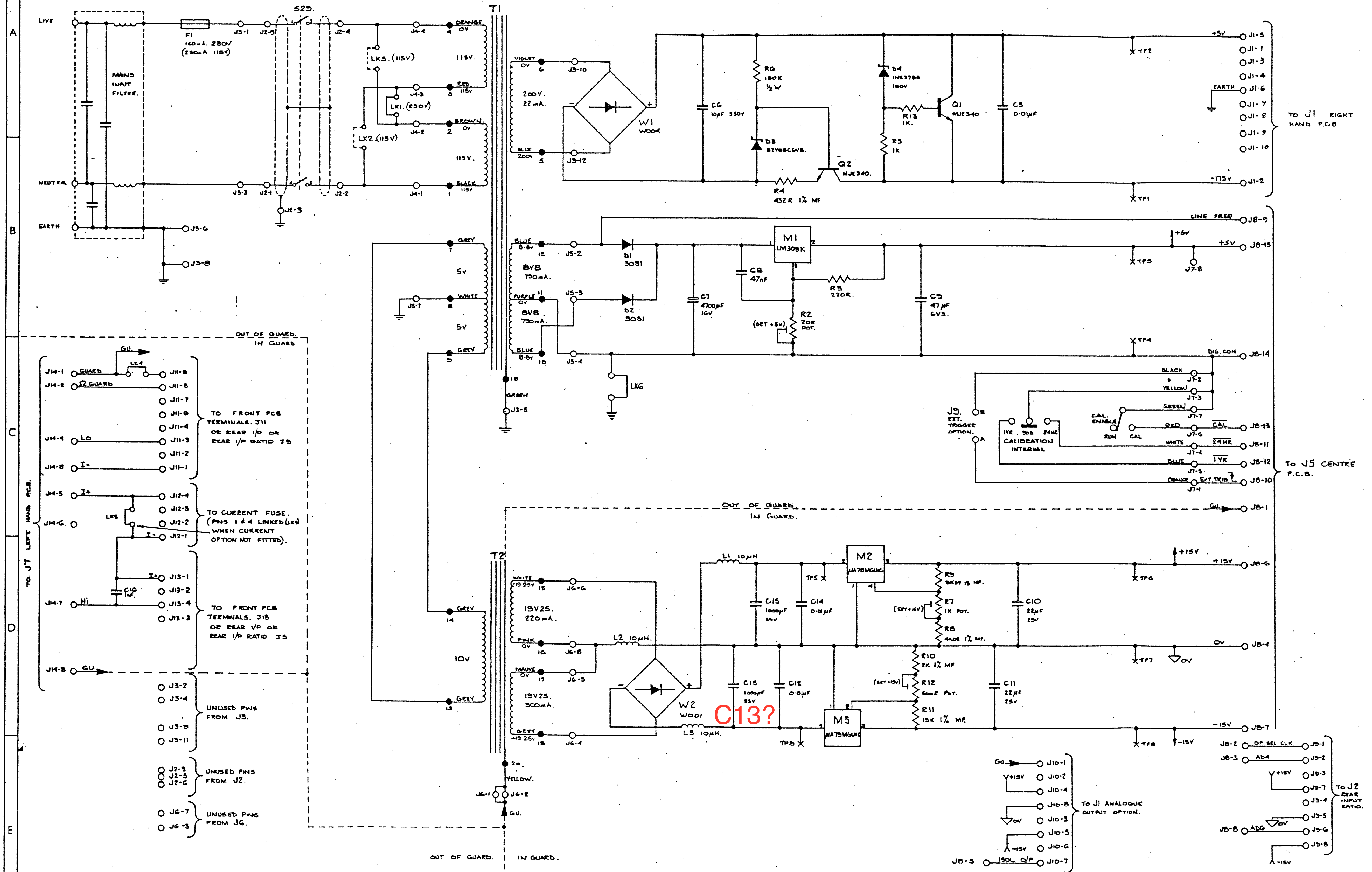
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. T1, T2, MAINS INPUT FILTER, F1, EXT. TRIG. OPTION, EEROE SELECT & CAL ENABLE. ARE ALL FITTED ON THE REAR PANEL ASSY 400308, BUT INCLUDED ON THIS CIRCUIT DIAGRAM.

ISS.	CHANGES
2	RE-DRAWN 30-3-79 B.J.
3	ECO 882 & 900. ADDED C18, R13, L1, L2, L3 & LK4. R3 & R2 CHANGED 8-6-79. B.J.
4	ECO 931 & 934. W1 WAS W006 (750013) J8 PIN 'No' CHANGED. J2 " " " LK5 ADDED. B.J. J8-8 ADDED. 31-10-79
5	ECO. 1085 J13 PINS 1 TO 4 DELETED IL 21.4.80
6	ECO. 1125 FUSE IN NEUTRAL LINE TO J3-5 DELETED. IL 22.5.80
7	ECO. 1452 M1 WAS MC7805CT C8 WAS 10nF IL 16.2.83
8	ECO. 1470 R1 (100k) & C1 (100nF) DELETED. LK6 ADDED IL 1.6.83


LIVE
NEUTRAL
EARTH
MAINS INPUT FILTER
F1 160mA. 230V (250mA 115V)
S25
T1
LK3. (115V)
LK1. (230V)
LK2 (115V)
ORANGE 0V
115V.
RED 115V
BROWN 0V
BLACK 115V
VIOLET 0V
200V. 22mA.
BLUE 200V
W1 W004
C6 10μF 350V
R6 180K ½W
D4 1N5278B 180V
D3 BZY88C6V8.
R13 1K.
R5 1K
Q1 MJE340
Q2 MJE340.
R4 432R 1% MF
C5 0·01μF
+5V
TP2
TP1
-175V
EARTH
J1-5
J1-1
J1-3
J1-4
J1-6
J1-7
J1-8
J1-9
J1-10
J1-2
TO J1 RIGHT HAND P.C.B
LINE FREQ
J8-9
GREY
WHITE
5V
BLUE 8·8V
PURPLE 0V
8V8 750mA.
D1 3051
D2 3051
M1 LM309K
C8 47nF
R3 220R.
R2 20R POT.
(SET +5V)
C7 4700μF 16V
C9 47μF 6V3.
+5V
J8-15
TP3
TP4
DIG. COM
J8-14
LK6
GREEN
J3-5
BLACK
YELLOW
GREEN
RED
WHITE
BLUE
ORANGE
J5. EXT. TRIGGER OPTION.
1YR 90D 24HR
CALIBRATION INTERVAL
CAL. ENABLE
RUN CAL
CAL.
24HR
1YR
EXT. TRIG
J8-13
J8-11
J8-12
J8-10
To J5 CENTRE P.C.B.
OUT OF GUARD.
IN GUARD.
GU.
J8-1
T2
WHITE +19·25V
19V25. 220mA.
PINK 0V
MAUVE 0V
19V25. 300mA.
GREY +19·25V
10V
L1 10μH
L2 10μH.
L3 10μH.
W2 W001
C13?
C15 1000μF 35V
C14 0·01μF
C12 0·01μF
M2 μA78M15UC
M3 μA79M15UC
R3 8K09 1% MF.
R7 1K POT.
(SET +15V)
R8 4K02 1% MF.
R10 2K 1% MF
R12 500R POT.
(SET -15V)
R11 15K 1% MF.
C10 22μF 25V
C11 22μF 25V
TP5
TP6
TP7
TP8
+15V
0V
-15V
J8-6
J8-4
J8-7
J14-1 GUARD
J14-2 Ω GUARD
LK4
J14-4 LO
J14-8 I-
J14-5 I+
J14-6
LK5
J14-7 Hi
C16 1nF.
J14-3 GU.
TO FRONT PCB TERMINALS. J11 OR REAR I/P OR REAR I/P RATIO J5
TO CURRENT FUSE. (PINS 1 & 4 LINKED (LK5) WHEN CURRENT OPTION NOT FITTED).
TO FRONT PCB TERMINALS. J13 OR REAR I/P OR REAR I/P RATIO J5
TO J7 LEFT HAND PCB.
UNUSED PINS FROM J3.
UNUSED PINS FROM J2.
UNUSED PINS FROM J6.
YELLOW.
J6-1
J6-2
GU.
J10-1
J10-2
J10-4
J10-8
J10-3
J10-5
J10-6
J10-7
TO J1 ANALOGUE OUTPUT OPTION.
J8-5 ISOL O/P
J8-2 OP SEL CLK
J8-3 ADA
J8-8 ADG
TO J2 REAR INPUT RATIO.
OUT OF GUARD.
IN GUARD.

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
B.J.		MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± ·005 DECIMAL TO 2 PLACES ± ·010 FRACTIONAL ± 1/64	
TRACED	APPROVED	SCALE	ANGULAR ± °	FINISH
DATE 30-3-79.	DATE	NOT TO BE SCALED	METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE REAR PCB (INCLUDING REAR PANEL) CIRCUIT DIAGRAM 1061/1071/1081

DRAWING No. 430295

SHEET 1 OF 1

REAR PCB CKTS

DRAWING No. 400295
FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

4 off. Steel M3x8mm Screw. 611016.
9 off. Nylon M3x8mm Screw. 611037.
4 off Steel Shakeproof Washer. 613005.
9 off Nylon M3 Washer . 613017.
2 off Steel M3 Nut . 615002.
3 off Nylon M3 Nut . 615008.

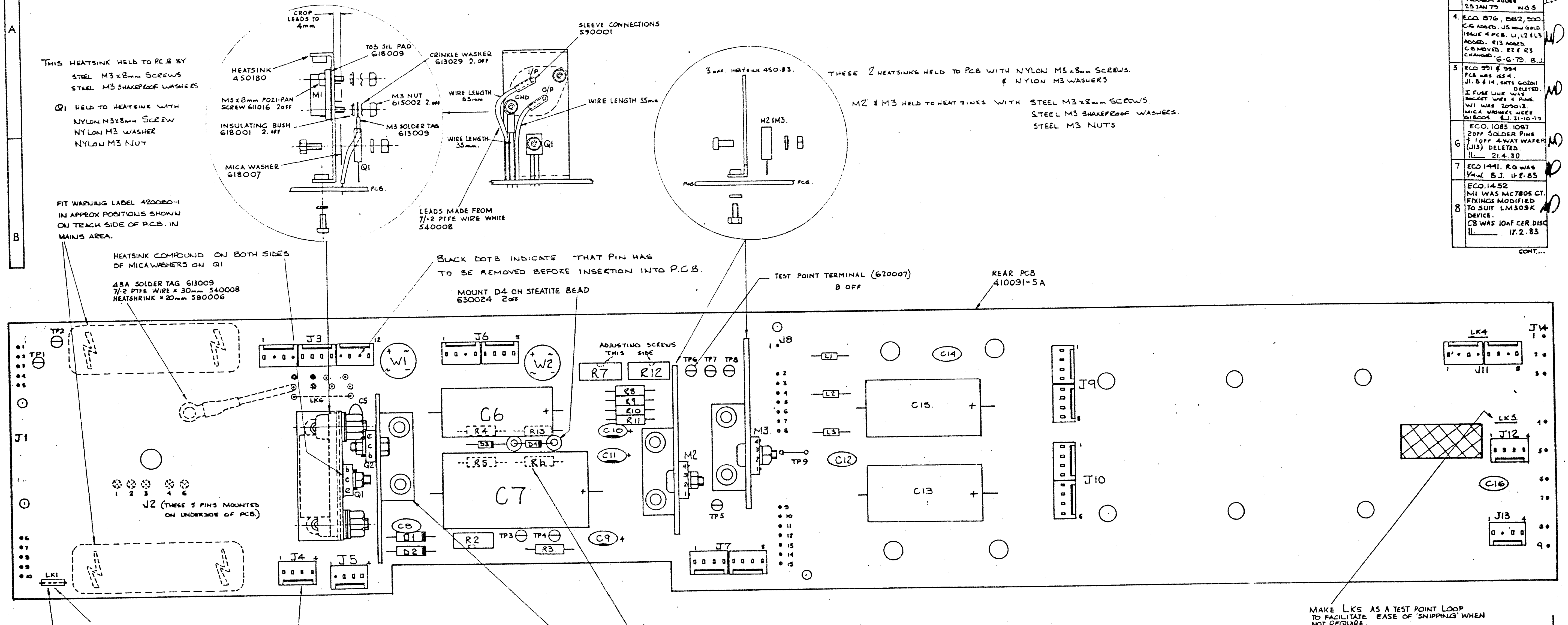
ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
C	
D	UPDATED PCB. B.J. 22-8-78
1	RELEASED TO PROD'N 29-8-78
2	ECO 783. 8-12-78 COMPONENT CHANGES. B.J.
3	E.C.O 816 WARNING LABEL 4200804 ADDED 25 JAN 79 W.G.S
4.	ECO. 876, 882, 900. C6 ADDED. J5 NOW GOLD. ISSUE 4 PCB. L1, L2 & L3 ADDED. R13 ADDED. C8 MOVED. R2 & R3 CHANGED. 6-6-79. B.J.
5	ECO 991 & 994 PCB WAS ISS 4. J1, 8 & 14. SKTS 602011 DELETED. I FUSE LINK WAS SOCKET WIRE & PINS. W1 WAS 209013. MICA WASHERS WERE 618005. B.J. 31-10-79
6	ECO. 1085. 1097 2 OFF SOLDER PINS & 1 OFF 4 WAY WAFER (J13) DELETED. IL 21.4.80
7	ECO 1441. R9 WAS 1/4W. B.J. 11-2-83
8	ECO.1452 M1 WAS MC7805 CT. FIXINGS MODIFIED TO SUIT LM309K DEVICE. C8 WAS 10nF CER.DISC IL 17.2.83

CONT....

REAR PCB


CROP LEADS TO 4mm
HEATSINK 450180
TO3 SIL PAD 618009
M3x8mm POZI-PAN SCREW 611016 2 off
INSULATING BUSH 618001 2. off
MICA WASHER 618007
M3 NUT 615002 2 off
M3 SOLDER TAG 613009
M1
Q1
PCB
CRINKLE WASHER 613029 2. off
SLEEVE CONNECTIONS 590001
WIRE LENGTH 65mm
WIRE LENGTH 35mm
WIRE LENGTH 55mm
I/P
O/P
GND
LEADS MADE FROM 7/·2 PTFE WIRE WHITE 540008
3 off HEATSINK 450183.
M2 & M3.
REAR PCB 410091-5A
TEST POINT TERMINAL (620007) 8 OFF
MOUNT D4 ON STEATITE BEAD 630024 2 off
BLACK DOTS INDICATE THAT PIN HAS TO BE REMOVED BEFORE INSERTION INTO P.C.B.
ADJUSTING SCREWS THIS SIDE
TP1
TP2
J1
J2 (THESE 5 PINS MOUNTED ON UNDERSIDE OF PCB)
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
J13
J14
W1
W2
LK1
LK4
LK5
LK6
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
Q1
Q2
M2
M3
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
D1
D2
D3
D4
L1
L2
L3
TP3
TP4
TP5
TP6
TP7
TP8
TP9

THIS HEATSINK HELD TO P.C.B BY
STEEL M3x8mm SCREWS
STEEL M3 SHAKEPROOF WASHERS

Q1 HELD TO HEATSINK WITH
NYLON M3x8mm SCREW
NYLON M3 WASHER
NYLON M3 NUT

THESE 2 HEATSINKS HELD TO PCB WITH NYLON M3x8mm SCREWS.
& NYLON M3 WASHERS

M2 & M3 HELD TO HEATSINKS WITH STEEL M3x8mm SCREWS
STEEL M3 SHAKEPROOF WASHERS.
STEEL M3 NUTS.

FIT WARNING LABEL 4200804 IN APPROX POSITIONS SHOWN ON TRACK SIDE OF P.C.B. IN MAINS AREA.

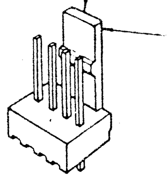
HEATSINK COMPOUND ON BOTH SIDES OF MICA WASHERS ON Q1

4BA SOLDER TAG 613009
7/·2 PTFE WIRE x 30mm 540008
HEATSHRINK x 20mm 590006

MAKE LK5 AS A TEST POINT LOOP TO FACILITATE EASE OF 'SNIPPING' WHEN NOT REQUIRED.

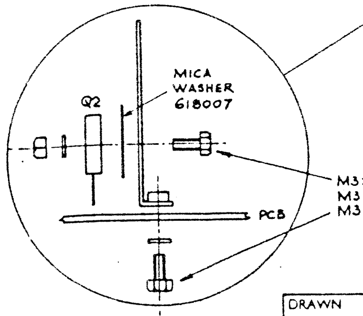
ALL LINKS USE 22 SWG TIN.CU. WIRE (DATRON PART No. 540002)

LINKS 1,2 & 3 MUST BE SLEEVED USING 590004



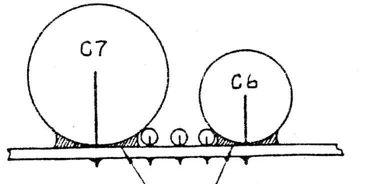
FLAT PIN ASSY GOLD (PART No 604033) 17 off.

BACKPLATE INDICATES WHICH WAY THE PIN ASSY FITS INTO THE P.C.B.


Q2
MICA WASHER 618007
PCB

M3x8mm NYLON SCREW
M3 NYLON WASHER
M3 NYLON NUT.

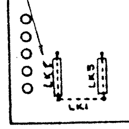
R4, R5 & R6 ARE POSITIONED UNDER THE CURVE OF C6 & C7. (AS SHOWN BELOW)



THE 4 LARGE CAPACITORS C6, C7, C13 & C15 ARE TO BE BEDDED INTO SILICONE RUBBER COMPOUND PART No 900004 BEFORE SOLDERING. THIS SHOULD FINISH UP AS ABOVE DRAWING.

NO	CHANGES
9	R1 & C1 DELETED. LK6 ADDED 4BA SOLDER TAG WIRE ASSY ADDED. IL 2.6.83 ECO 1470
10	ECO 1517 J3,4,6,7,9,10 WERE TIN. JR 17·8·83
11	ECO 1525 D1 AND D2 WERE 200010. PCB WAS ISSUE 5. JR 15·9·83
12	ECO. 1688 D4 MOUNTED ON STEATITE BEADS. IL 20.8.84

FOR 115V OPERATION
REMOVE LK1, FIT LK2 & LK3



DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES
B.J.		MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± ·005 DECIMAL TO 2 PLACES ± ·010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED ANGULAR ±°
TRACED	APPROVED	SCALE 2:1	
DATE 26-4-78	DATE	NOT TO BE SCALED	

MATERIAL
FINISH

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE Rear P.C.B. Assembly. 1061/1071/1081

DRAWING No. 400295

SHEET 1 of 6

DRAWING No.
430296

FIRST USED ON
1061 / 1071

THIRD ANGLE PROJECTION

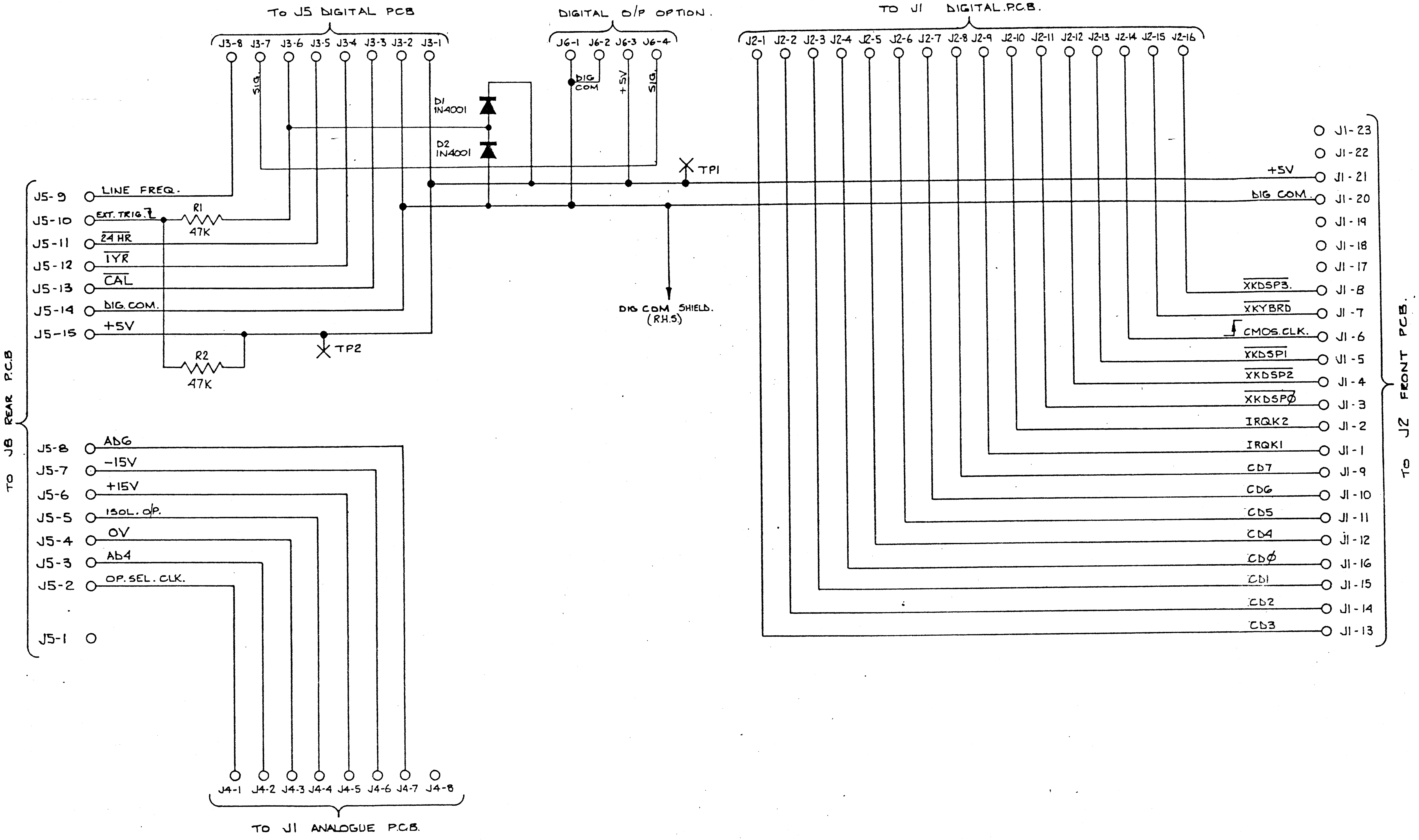
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. "IN GUARD" TRACKS TO BE ON CCT. SIDE (SHT. 2) & "OUT OF GUARD" TRACKS TO BE ON THE COMP. SIDE (SHT. 3) OF P.C.B. WHERE POSSIBLE.

ISS.	CHANGES
D	
1ᶜ	RELEASED TO PROD'N 29-5-78.
2	ECO. 849. JG-4 SIG JOINED TO J3-7. B.J. 4-5-79.
3	ECO 992. B.J. J5-8 ADDED & J5-1 GU. DELETED 29-10-79



TO J5 DIGITAL PCB
J3-8 J3-7 J3-6 J3-5 J3-4 J3-3 J3-2 J3-1
SIG.
D1 1N4001
D2 1N4001
DIGITAL O/P OPTION.
J6-1 J6-2 J6-3 J6-4
DIG COM
+5V
SIG.
TO J1 DIGITAL P.C.B.
J2-1 J2-2 J2-3 J2-4 J2-5 J2-6 J2-7 J2-8 J2-9 J2-10 J2-11 J2-12 J2-13 J2-14 J2-15 J2-16
TP1
+5V
DIG COM.
DIG COM SHIELD. (R.H.S)
J5-9 LINE FREQ.
J5-10 EXT. TRIG.
R1 47K
J5-11 24 HR
J5-12 1YR
J5-13 CAL
J5-14 DIG. COM.
J5-15 +5V
TP2
R2 47K
TO J8 REAR P.C.B
J5-8 ADG
J5-7 −15V
J5-6 +15V
J5-5 ISOL. O/P.
J5-4 OV
J5-3 Ab4
J5-2 OP. SEL. CLK.
J5-1
J4-1 J4-2 J4-3 J4-4 J4-5 J4-6 J4-7 J4-8
TO J1 ANALOGUE P.C.B.
J1-23
J1-22
J1-21
J1-20
J1-19
J1-18
J1-17
XKDSP3. J1-8
XKYBRD J1-7
CMOS.CLK. J1-6
XKDSP1 J1-5
XKDSP2 J1-4
XKDSP0 J1-3
IRQK2 J1-2
IRQK1 J1-1
CD7 J1-9
CD6 J1-10
CD5 J1-11
CD4 J1-12
CD0 J1-16
CD1 J1-15
CD2 J1-14
CD3 J1-13
TO J2 FRONT PCB.

CENTER PCB CKTS

DRAWN	CHECKED	DIMENSIONS IN
BJ.		MILLIMETRES
TRACED	APPROVED	SCALE
DATE 30-5-78	DATE	NOT TO BE SCALED

TOLERANCES ANGULAR ± ½°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± ·005
DECIMAL TO 2 PLACES ± ·010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A2

TITLE
CENTRE PCB SCHEMATIC 1061 / 1071 / 1081

DRAWING No. 430296

SHEET 1 OF 1

I W 1162

DRAWING No.
400296
FIRST USED ON 1061 /1071

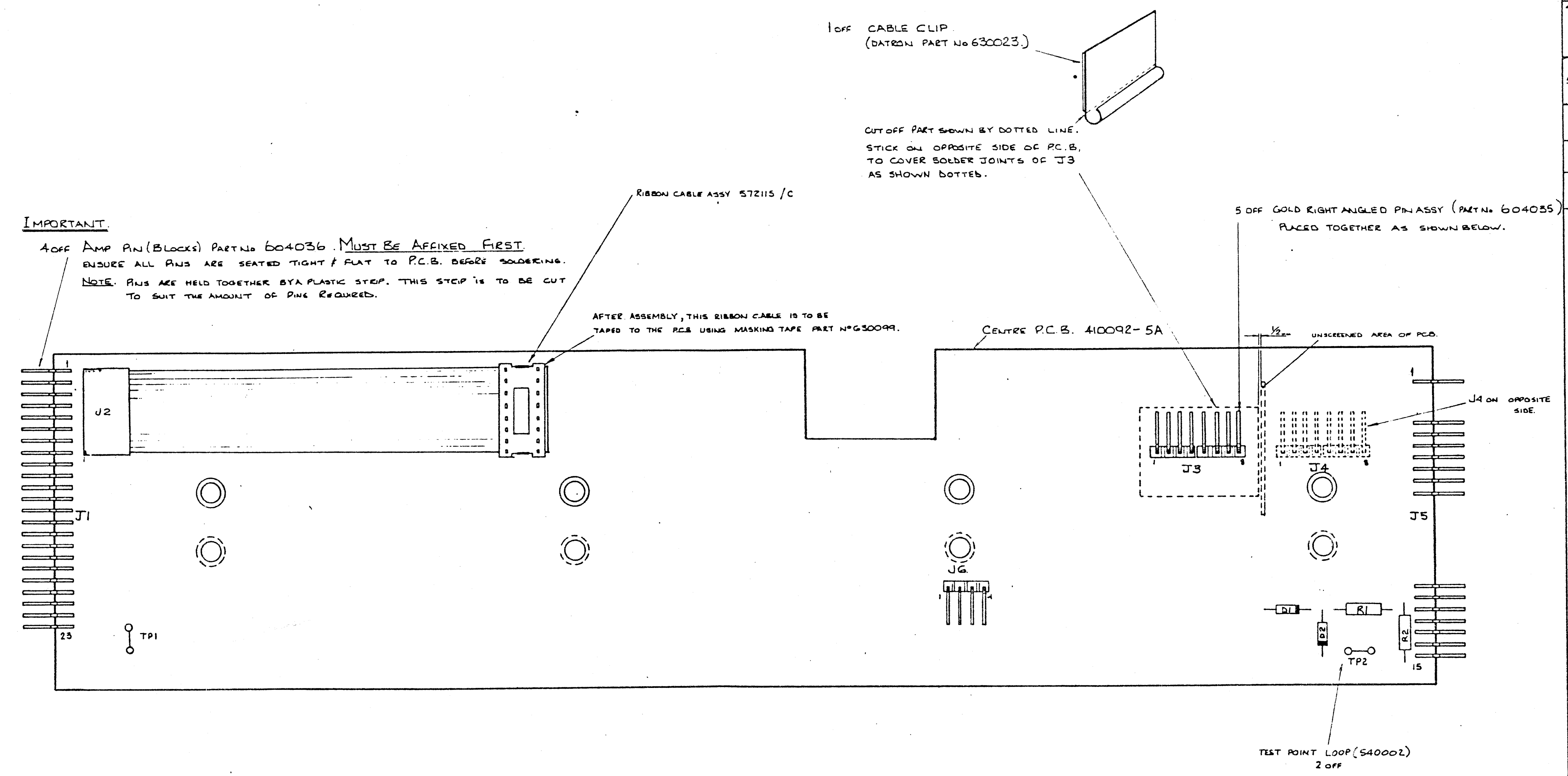
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
C	
D	D1, D2, D3, R1 & R2 ADDED IN NEW ISS PCB. B.J. 25-8-78.
1	RELEASED TO PROD'N' 29-9-78
2	ECO 784. RIBBON CABLE MODS. B.J. 6-12-78
3	ECO 843. PCB MODS. B.J. 4-5-79.
4	ECO 867. PCB UPDATE. B.J. 11-6-79. & ECO 904 572130 CHANGE TO 572100/A 606006. CLIPS REMOVED & ECO 876 J3, 4 & C NOW GOLD NOT TIN.
5	ECO 992 26-10-79. PCB WAS ISS 4A. B.J. PIN 8 OF J5 ADDED. PCB CUT OUT INCREASED IN DEPTH.
6	ECO. 1000 RIBBON CABLE ASSY WAS 572100/A IL 18.1.80
7	ECO. 1102 PCB WAS ISSUE 5 IL 14.4.80
8	ECO 1217 RIBBON CABLE WAS 572130/B JR 18.8.81



1 OFF CABLE CLIP (DATRON PART No 630023.)

CUT OFF PART SHOWN BY DOTTED LINE.

STICK ON OPPOSITE SIDE OF P.C.B, TO COVER SOLDER JOINTS OF J3 AS SHOWN DOTTED.

IMPORTANT.

4 OFF AMP PIN (BLOCKS) PART No 604036. MUST BE AFFIXED FIRST.

ENSURE ALL PINS ARE SEATED TIGHT & FLAT TO P.C.B. BEFORE SOLDERING.

NOTE. PINS ARE HELD TOGETHER BY A PLASTIC STRIP. THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT OF PINS REQUIRED.

RIBBON CABLE ASSY 572115 /C

AFTER ASSEMBLY, THIS RIBBON CABLE IS TO BE TAPED TO THE P.C.B USING MASKING TAPE PART N° 630099.

CENTRE P.C.B. 410092-5A

5 OFF GOLD RIGHT ANGLED PIN ASSY (PART No 604035) PLACED TOGETHER AS SHOWN BELOW.

UNSCREENED AREA OF PCB.

J4 ON OPPOSITE SIDE.

TEST POINT LOOP (540002) 2 OFF

CENTER PCBS

DRAWN B.J.	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE 2:1 NOT TO BE SCALED		FINISH	TITLE CENTRE P.C.B ASSEMBLY. 1061/1071/1081
DATE 25-4-78	DATE				

DRAWING SIZE		
A1		
DRAWING No. 400296	SHEET 1 OF 2	

DRAWING No.
430298
FIRST USED ON
1061 / 1071

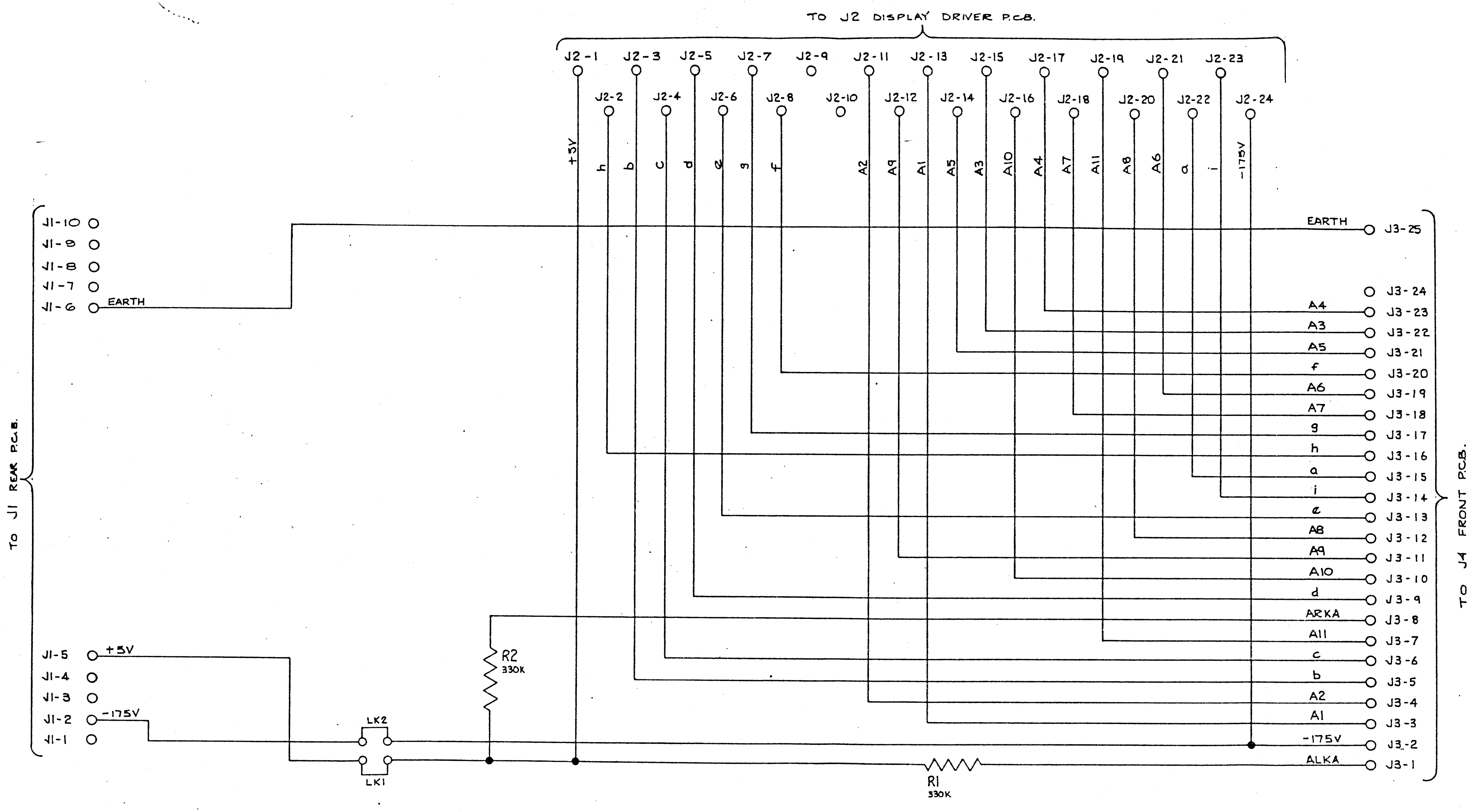
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
D	
1c	RELEASED TO PROD 25-9-78
2	DIG COM SCREEN REMOVED. BJ. ECO 850 4-5-79.


TO J2 DISPLAY DRIVER P.C.B.
J2-1
J2-2
J2-3
J2-4
J2-5
J2-6
J2-7
J2-8
J2-9
J2-10
J2-11
J2-12
J2-13
J2-14
J2-15
J2-16
J2-17
J2-18
J2-19
J2-20
J2-21
J2-22
J2-23
J2-24
+5V
h
b
c
d
e
g
f
A2
A9
A1
A5
A3
A10
A4
A7
A11
A8
A6
a
i
-175V
TO J1 REAR P.C.B.
J1-10
J1-9
J1-8
J1-7
J1-6
EARTH
J1-5
+5V
J1-4
J1-3
J1-2
-175V
J1-1
LK2
LK1
R2
330K
R1
330K
EARTH
J3-25
J3-24
A4
J3-23
A3
J3-22
A5
J3-21
f
J3-20
A6
J3-19
A7
J3-18
g
J3-17
h
J3-16
a
J3-15
i
J3-14
e
J3-13
A8
J3-12
A9
J3-11
A10
J3-10
d
J3-9
ARKA
J3-8
A11
J3-7
c
J3-6
b
J3-5
A2
J3-4
A1
J3-3
-175V
J3-2
ALKA
J3-1
TO J4 FRONT P.C.B.

RIGHT HAND PCB CKTS

DRAWN	CHECKED	DIMENSIONS IN
B.J.		MILLIMETRES
TRACED	APPROVED	SCALE
DATE 26-5-78	DATE	NOT TO BE SCALED

TOLERANCES ANGULAR ± ½°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE
R.H. SIDE P.C.B. SCHEMATIC. 1061/1071/1081

DRAWING No.
430298

DRAWING SIZE
A2

SHEET
1 OF 1

DRAWING No.
430297
FIRST USED ON
1061 / 1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

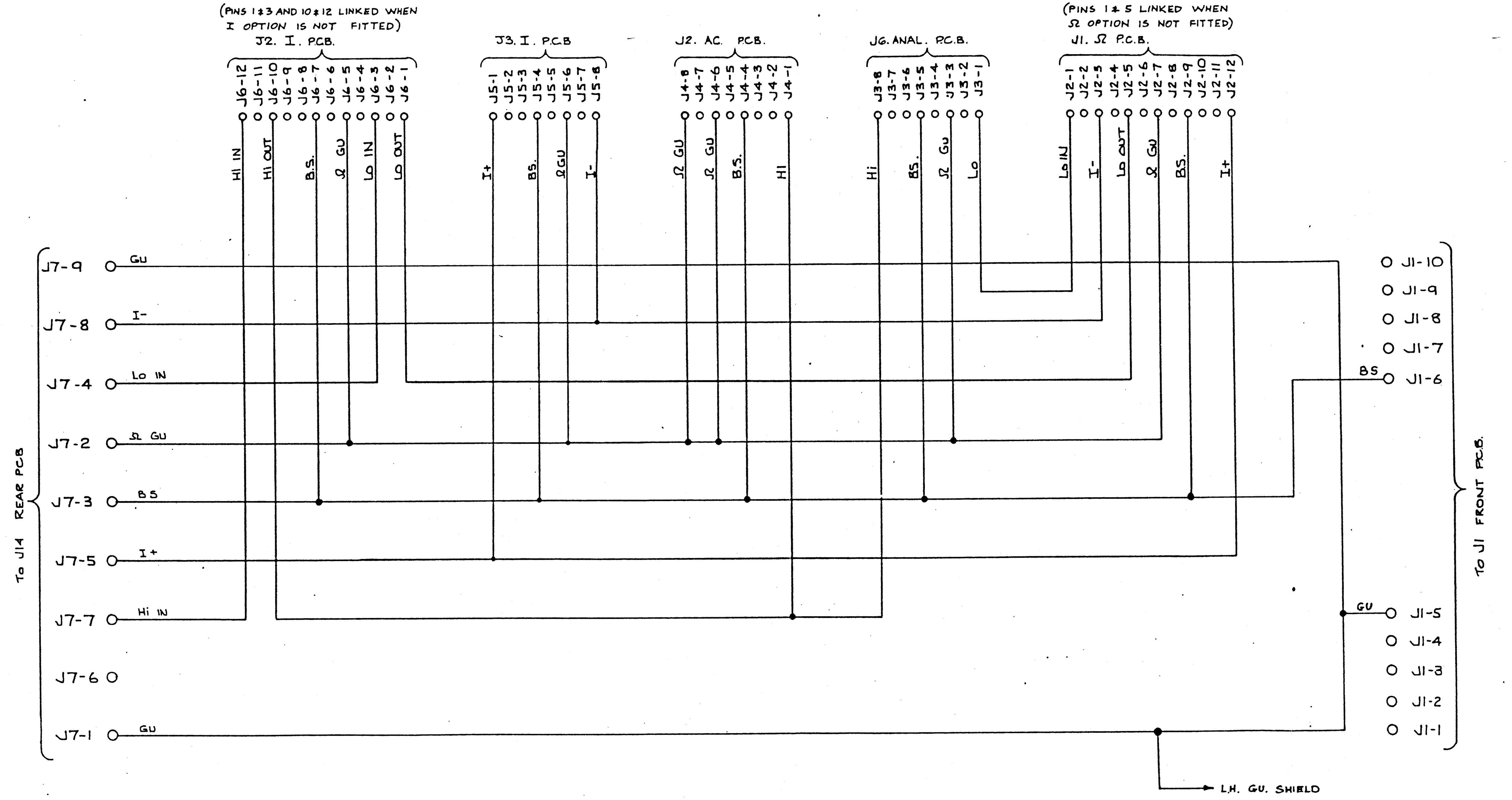
1/ ALL CIRCUIT TO BE ON THE COMPONENT (SHEET 3) SIDE OF P.C.B WHERE POSSIBLE.

2/ INPUT GUARD, VIA J7-1 TO PROVIDE ELECTROSTATIC SHIELD ON 'CIRCUIT' (SHEET 2) SIDE OF P.C.B. WHERE POSSIBLE.

3/ B.S, VIA J3-5, TO ENCLOSE Hi AND I+ CIRCUITS ON P.C.B WHERE POSSIBLE.

4/ Ω GUARD VIA J3-3 TO ENCLOSE LO & I- CIRCUITS ON P.C.B WHERE POSSIBLE.

ISS.	CHANGES
D	
1	RELEASED TO PROD'N'. 29-9-78


(PINS 1 & 3 AND 10 & 12 LINKED WHEN I OPTION IS NOT FITTED)
J2. I. P.C.B.
J6-12 J6-11 J6-10 J6-9 J6-8 J6-7 J6-6 J6-5 J6-4 J6-3 J6-2 J6-1
Hi IN
Hi OUT
B.S.
Ω GU
Lo IN
Lo OUT
J3. I. P.C.B
J5-1 J5-2 J5-3 J5-4 J5-5 J5-6 J5-7 J5-8
I+
BS.
ΩGU
I-
J2. AC. P.C.B.
J4-8 J4-7 J4-6 J4-5 J4-4 J4-3 J4-2 J4-1
Ω GU
Ω GU
B.S.
HI
J6. ANAL. P.C.B.
J3-8 J3-7 J3-6 J3-5 J3-4 J3-3 J3-2 J3-1
Hi
BS.
Ω Gu
Lo
(PINS 1 & 5 LINKED WHEN Ω OPTION IS NOT FITTED)
J1. Ω P.C.B.
J2-1 J2-2 J2-3 J2-4 J2-5 J2-6 J2-7 J2-8 J2-9 J2-10 J2-11 J2-12
Lo IN
I-
Lo OUT
Ω Gu
BS.
I+
J7-9 GU
J7-8 I-
J7-4 Lo IN
J7-2 Ω GU
J7-3 BS
J7-5 I+
J7-7 Hi IN
J7-6
J7-1 GU
To J14 REAR PCB
J1-10
J1-9
J1-8
J1-7
BS J1-6
GU J1-5
J1-4
J1-3
J1-2
J1-1
To J1 FRONT PCB
L.H. GU. SHIELD

LEFT HAND PCB CCTS

DRAWN B.J.	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS DECIMAL TO 3 PLACES ± ·005 DECIMAL TO 2 PLACES ± ·010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL
TRACED	APPROVED	SCALE		FINISH
DATE 30.5.78	DATE	NOT TO BE SCALED		

JW 1162

datron ELECTRONICS LTD. NORWICH.

TITLE
L.H. P.C.B. SCHEMATIC 1061/1071/1081

DRAWING SIZE
A2

DRAWING No.
430297

SHEET
1 OF 1

DRAWING No.
400297.
FIRST USED ON 1061 / 71

THIRD ANGLE PROJECTION

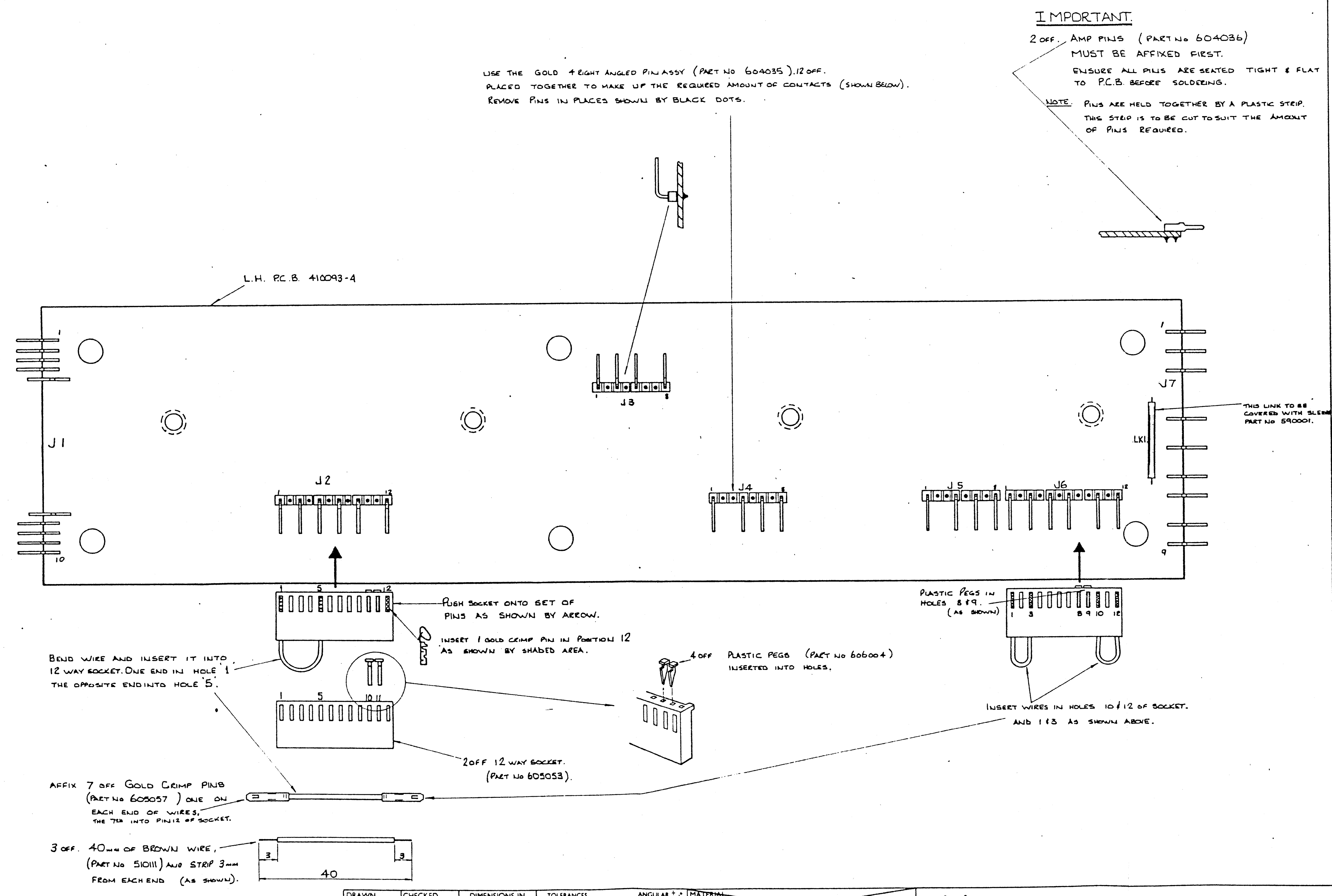
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
C	–
D	NEW ISSUE P.C.B. BJ. 14-8-78 MD
1	RELEASED TO PROD'N 29-9-78
2	ECO 867 PCB UPDATE BJ 11-6-79. MD

LEFT HAND PCB



USE THE GOLD 4 RIGHT ANGLED PIN ASSY (PART NO 604035).12 OFF.
PLACED TOGETHER TO MAKE UP THE REQUIRED AMOUNT OF CONTACTS (SHOWN BELOW).
REMOVE PINS IN PLACES SHOWN BY BLACK DOTS.

IMPORTANT.

2 OFF. AMP PINS (PART No 604036)
MUST BE AFFIXED FIRST.
ENSURE ALL PINS ARE SEATED TIGHT & FLAT
TO P.C.B. BEFORE SOLDERING.

NOTE. PINS ARE HELD TOGETHER BY A PLASTIC STRIP.
THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT
OF PINS REQUIRED.

THIS LINK TO BE
COVERED WITH SLEEVE
PART No 590001.

PUSH SOCKET ONTO SET OF
PINS AS SHOWN BY ARROW.

INSERT 1 GOLD CRIMP PIN IN POSITION 12
AS SHOWN BY SHADED AREA.

BEND WIRE AND INSERT IT INTO
12 WAY SOCKET. ONE END IN HOLE '1'
THE OPPOSITE END INTO HOLE '5'.

4 OFF PLASTIC PEGS (PART No 606004)
INSERTED INTO HOLES.

2 OFF 12 WAY SOCKET.
(PART No 605053).

PLASTIC PEGS IN
HOLES 8 & 9.
(AS SHOWN)

INSERT WIRES IN HOLES 10 & 12 OF SOCKET.
AND 1 & 3 AS SHOWN ABOVE.

AFFIX 7 OFF GOLD CRIMP PINS
(PART No 605057) ONE ON
EACH END OF WIRES,
THE 7TH INTO PIN 12 OF SOCKET.

3 OFF. 40mm OF BROWN WIRE,
(PART No 510111) AND STRIP 3mm
FROM EACH END (AS SHOWN).

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE
B.T.		MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 ANGULAR ± °			A1
TRACED	APPROVED	SCALE	METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	FINISH	TITLE 1061/71/81 L.H. P.C.B. ASSEMBLY	DRAWING No. 400297
DATE 21-4-78	DATE	2:1 NOT TO BE SCALED				SHEET 1 OF

DRAWING No.	400298.
FIRST USED ON	1061/71

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
C	
D	NEW ISSUE P.C.B. B.J. 24-8-78
1	RELEASED TO PROD'N 25-5-78.
2	ECO 850. 4-5-79. B.J. UPDATED PCB. J1-6 WAS REMOVED.
3	ECO 867 & 901. B.J. UPDATED PCB. CABLE ASSY 400368 CHANGED TO 574250/A.
4	ECO. 943. 10.9.79 RIBBON CABLE ASSY. WAS 574250/A IL
5	ECO 1217 J2 WAS 400365. JR 18-8-81
6	ECO 1474 PCB ISSUE Nº WAS 4 IL 3.6.83

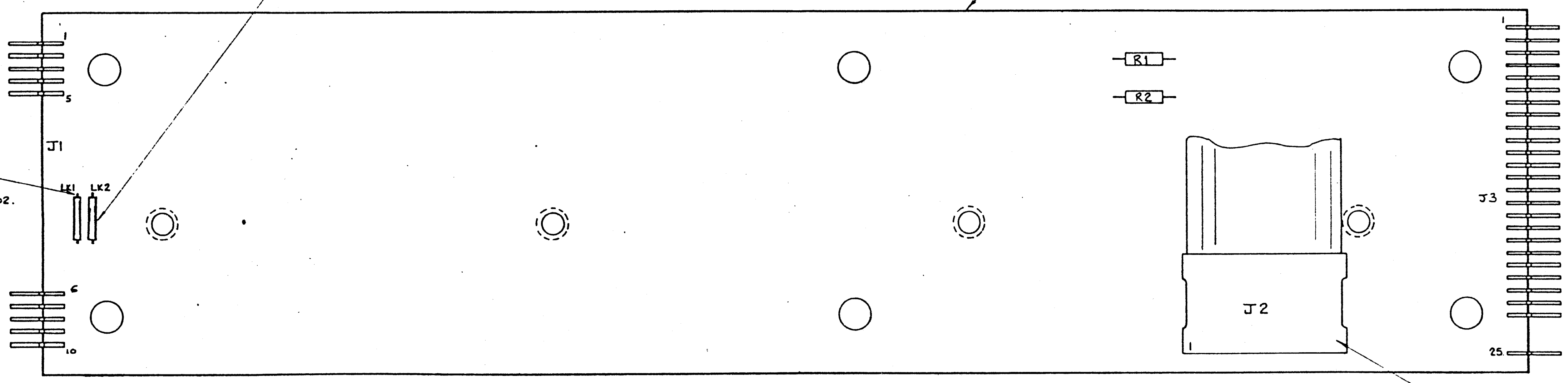
B.J

RIGHT HAND PCB

RIGHT HAND SIDE P.C.B 410094-4A

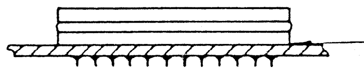
LK1 & LK2 MUST BE COVERED WITH SLEEVE PART NO 590001.

LINKS USE 22SWG TINNED CU WIRE. DATRON PART No 540002.



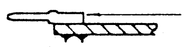
RIBBON CABLE ASSY
PART No 574270/C

NOTE. WHEN. SOLDERING CABLE PLUG INTO BOARD ENSURE THAT THE PLUG BODY SITS FLAT AGAINST PCB.



AFTER ASSEMBLING P.C.B WRAP THE ABOVE RIBBON CABLE ROUND THE P.C.B AND TAPE DOWN USING MASKING TAPE PART No 630099.

IMPORTANT



AMP PINS (DATRON PART No.604036.) 4 OFF MUST BE AFFIXED TO P.C.B FIRST. ENSURE ALL PINS ARE SEATING TIGHTLY AND FLAT TO PCB. BEFORE SOLDERING.

NOTE. PINS ARE HELD TOGETHER BY PLASTIC STRIP. THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT OF PINS REQUIRED.

FOR EXAMPLE. ABOVE 2 BLOCKS OF 5 PINS ARE REQUIRED, THEREFORE STRIP OF 10 PINS TO BE CUT IN HALF.

DRAWN B.T.	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± 005 DECIMAL TO 2 PLACES ± 010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED
TRACED	APPROVED	SCALE 2:1 NOT TO BE SCALED	
DATE 20.4.78.	DATE		

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE 1061/71/81. R.H. P.C.B. ASSEMBLY.	DRAWING SIZE A1	DRAWING No. 400298	SHEET 1 OF 2

DRAWING No.
430308
FIRST USED ON 1061 - 1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

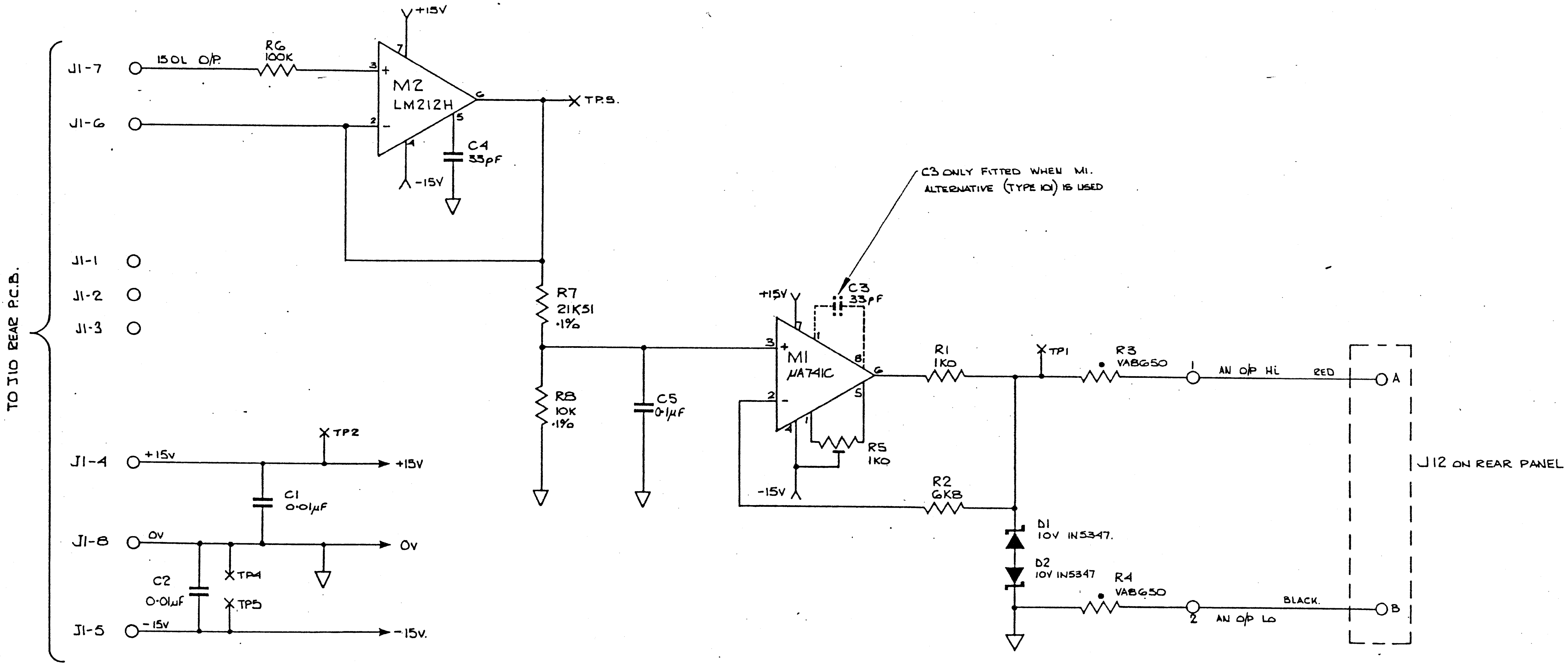
ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED. 27-DEC-78. W.G.S.
2	R7 WAS 21K73 ECO. 945 10.9.79 IL

BJ

ANALOG OUT


+15V
J1-7
150L O/P
R6
100K
3
+
M2
LM212H
7
6
X TP.8.
J1-6
2
−
5
4
C4
33pF
−15V
C3 ONLY FITTED WHEN M1.
ALTERNATIVE (TYPE 101) IS USED
J1-1
J1-2
J1-3
TO J10 REAR P.C.B.
R7
21K51
·1%
+15V
C3
33pF
1
8
7
3
+
M1
μA741C
2
−
6
5
4
1
R5
1K0
−15V
R1
1K0
X TP1
R3
VA8G50
1
AN O/P HI
RED
A
J12 ON REAR PANEL
R8
10K
·1%
C5
0·1μF
X TP2
J1-4
+15v
+15V
C1
0·01μF
J1-8
0V
0V
C2
0·01μF
X TP4
X TP5
J1-5
−15V
−15V.
R2
6K8
D1
10V IN5347.
D2
10V IN5347
R4
VA8G50
BLACK.
2
AN O/P LO
B

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
B.J.	MD	—		
TRACED	APPROVED	MILLIMETRES		
DATE 29-11-78	DATE	SCALE — NOT TO BE SCALED		FINISH

TOLERANCES ANGULAR + ½°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± ·005
DECIMAL TO 2 PLACES ± 010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A2

TITLE ANALOGUE OUTPUT CIRCUIT. 1061/1071/1081

DRAWING No. 430308

SHEET 1 OF 1

JW1162

DRAWING No.
400308.
FIRST USED ON
1061 - 1071

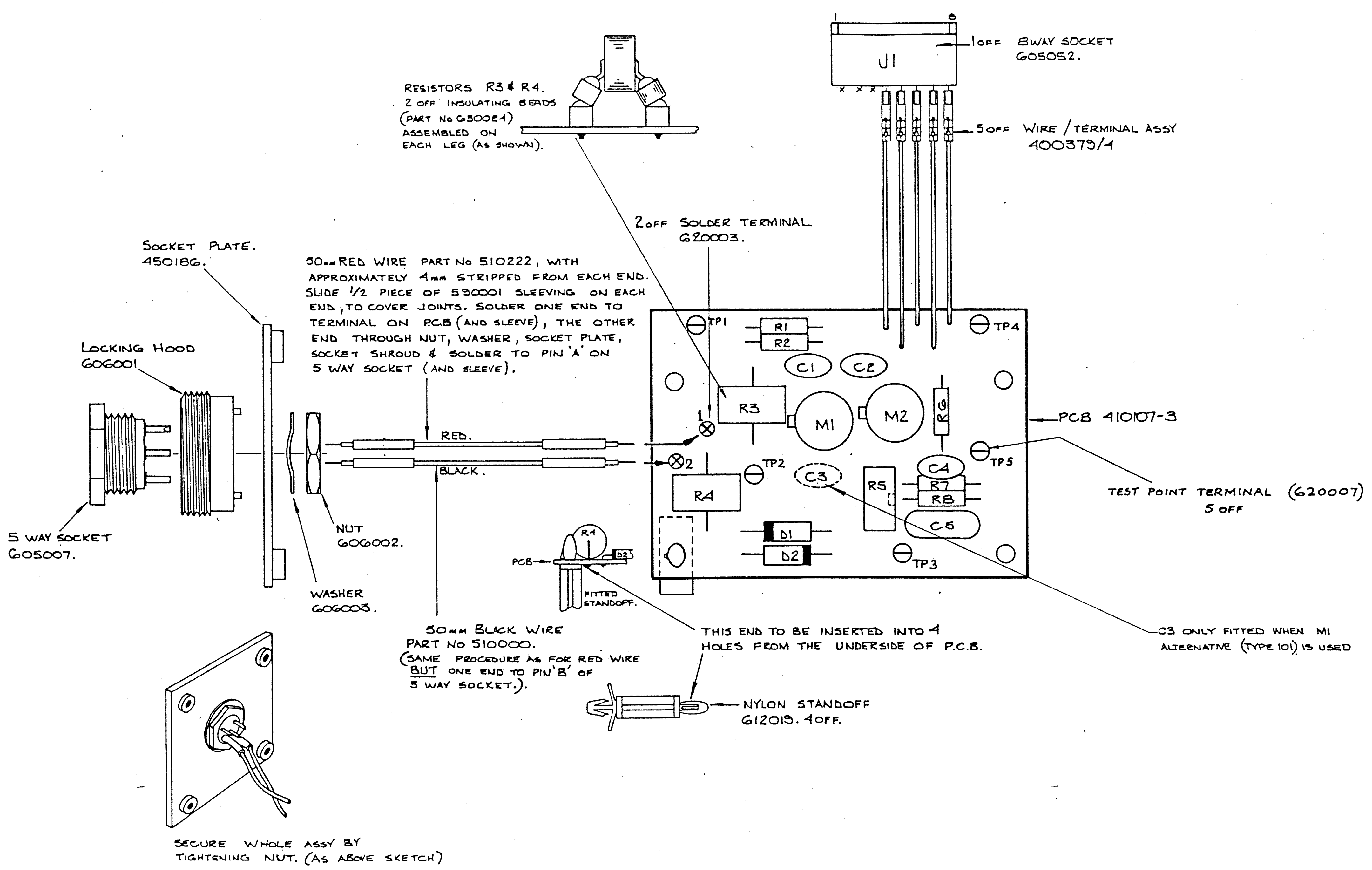
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED. 27-DEC-78. W.G.S.
2	POSITION OF TAG ON M1 & M2 CORRECTED. D2 POSITION REVERSED. ECO. 907 20.6.79 IL
3	PARTS LIST CHANGE TO R7 ECO. 945 10.9.79 IL



1 OFF 8WAY SOCKET 605052.

5 OFF WIRE / TERMINAL ASSY 400379/4

RESISTORS R3 & R4.
2 OFF INSULATING BEADS
(PART No G30024)
ASSEMBLED ON
EACH LEG (AS SHOWN).

2 OFF SOLDER TERMINAL
620003.

SOCKET PLATE.
450186.

50mm RED WIRE PART No 510222, WITH APPROXIMATELY 4mm STRIPPED FROM EACH END. SLIDE 1/2 PIECE OF 590001 SLEEVING ON EACH END, TO COVER JOINTS. SOLDER ONE END TO TERMINAL ON PCB (AND SLEEVE), THE OTHER END THROUGH NUT, WASHER, SOCKET PLATE, SOCKET SHROUD & SOLDER TO PIN 'A' ON 5 WAY SOCKET (AND SLEEVE).

LOCKING HOOD
606001

PCB 410107-3

TEST POINT TERMINAL (620007)
5 OFF

5 WAY SOCKET
605007.

NUT
606002.

WASHER
606003.

50mm BLACK WIRE
PART No 510000.
(SAME PROCEDURE AS FOR RED WIRE BUT ONE END TO PIN 'B' OF 5 WAY SOCKET.).

THIS END TO BE INSERTED INTO 4 HOLES FROM THE UNDERSIDE OF P.C.B.

C3 ONLY FITTED WHEN M1 ALTERNATIVE (TYPE 101) IS USED

NYLON STANDOFF
612019. 4 OFF.

SECURE WHOLE ASSY BY TIGHTENING NUT. (AS ABOVE SKETCH)

DRAWN B.J.	CHECKED 29.12.78	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR + ½° INCH DIMENSIONS DECIMAL TO 3 PLACES ± ·005 DECIMAL TO 2 PLACES ± ·010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ∓ 4mm UNLESS OTHERWISE STATED	MATERIAL
TRACED	APPROVED	SCALE 2 : 1 NOT TO BE SCALED		FINISH
DATE 27-11-78	DATE			

JW 1162

datron ELECTRONICS LTD. NORWICH.

TITLE
ANALOGUE OUTPUT P.C.B ASSY. 1061/1071/1081

DRAWING SIZE
A2

DRAWING No.
400308

SHEET
1 OF 4

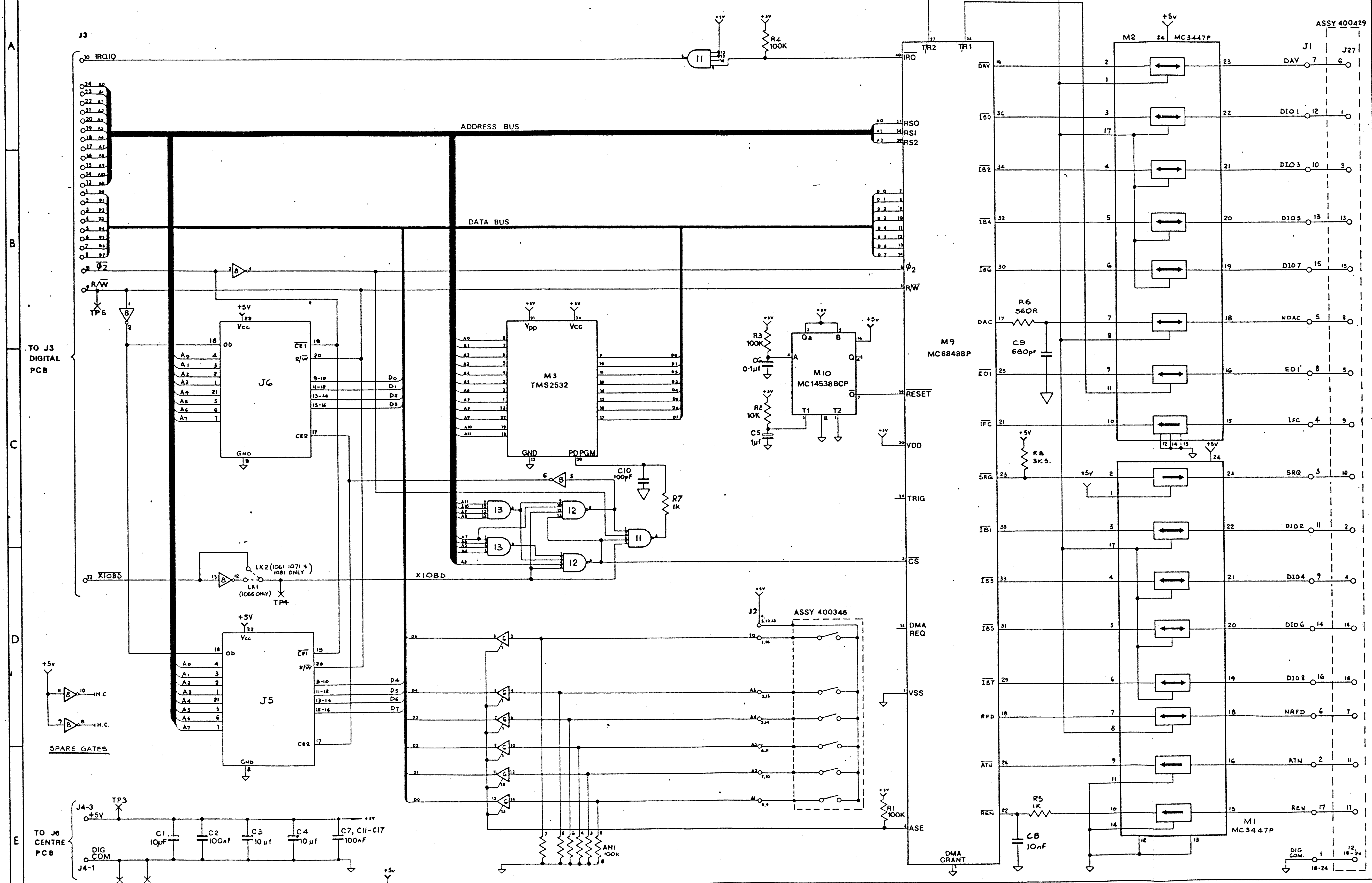
ANALOG OUT PCB

DRAWING No. 430427

FIRST USED ON 1065

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308


1
2
3
4
5
6
7
A
B
C
D
E
J3
IRQ10
ADDRESS BUS
DATA BUS
Φ2
R/W
TP5
TO J3 DIGITAL PCB
X1OBD
LK2 (1061 1071 & 1081 ONLY)
LK1 (1065 ONLY)
TP4
J6
J5
OD
Vcc
GND
+5V
CE1
CE2
M3
TMS2532
Ypp
PD PGM
C10
100pF
R7
1K
R4
100K
R3
100K
R2
10K
C6
0·1μf
C5
1μf
M10
MC14538BCP
M9
MC68488P
TR2
TR1
IRQ
RS0
RS1
RS2
RESET
VDD
TRIG
CS
DMA REQ
VSS
ASE
DMA GRANT
J2
ASSY 400346
R1
100K
AN1
100k
R6
560R
C9
680pF
R8
3K3
R5
1K
C8
10nF
M2
MC3447P
M1
MC3447P
ASSY 400429
J1
J27
DAV
DIO1
DIO3
DIO5
DIO7
NDAC
EOI
IFC
SRQ
DIO2
DIO4
DIO6
DIO8
NRFD
ATN
REN
DIG COM
SPARE GATES
N.C.
TO J6 CENTRE PCB
J4-3
J4-1
TP3
TP1
TP2
C1
10μF
C2
100nF
C3
10μf
C4
10μf
C7, C11-C17
100nF
M6
14503
M8
74LS04
M11
74LS20
M12
74LS30
M13
74LS21

ISS.	CHANGES
A	
B	M7. LK1. LK2 DELETED IL 26 11 80
1	RELEASED 18 12 80
2	ECO 1297 R5 & C8 ADDED 29·3·82. BJ.
3	ECO 1347 R6 AND C9 ADDED JR 7·7·82
4	ECO. 1448. M4 AND M5 DELETED IL 16.2.83.
5	ECO. 1549. R7/C10 ADDED IL 28.10.83
6	ECO. 1538 C2 WAS 10nF C.D. C7 WAS 10μF TANT. C11-C17 ADDED. IL 28.2.84
7	ECO 1681 R8 ADDED. 20-7-84. BJ.

IEEE 488 / GP1B

DRAWN	CHECKED	DIMENSIONS IN .	TOLERANCES	MATERIAL
IL	D. NELSON	MILLIMETRES		
TRACED	APPROVED	SCALE		FINISH
DATE 14 10 80	DATE	NOT TO BE SCALED		

TOLERANCES ANGULAR ± °
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± ·005
DECIMAL TO 2 PLACES ± ·010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE IEEE 488 OPTION CIRCUIT DIAGRAM 1065. 1061. 1071. 1081

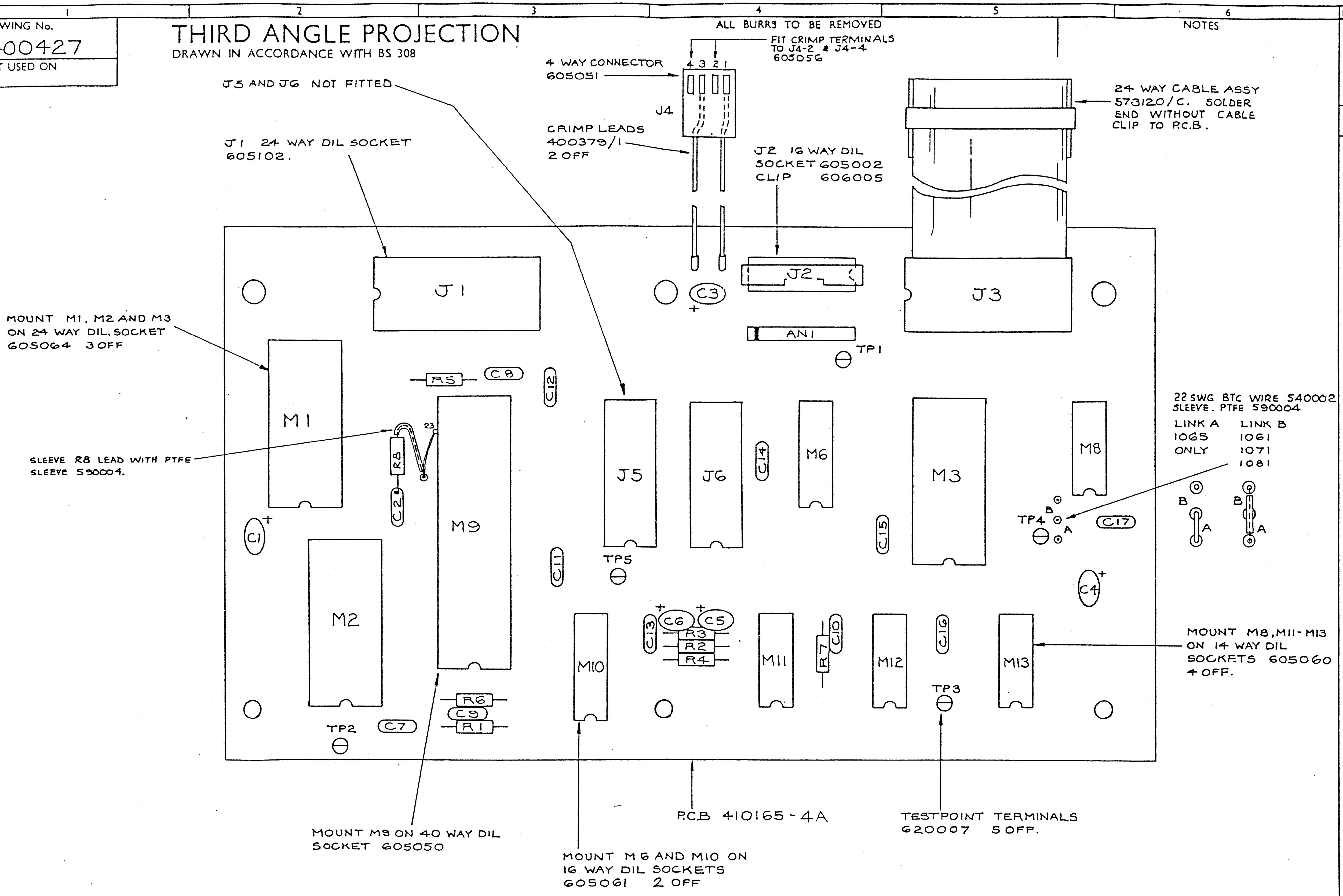
DRAWING No. 430427

SHEET 1 OF 1

DRAWING No.
400427
FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308


ALL BURRS TO BE REMOVED
NOTES
FIT CRIMP TERMINALS TO J4-2 & J4-4 605056
4 WAY CONNECTOR 605051
4 3 2 1
J4
CRIMP LEADS 400379/1 2 OFF
J5 AND J6 NOT FITTED
J1 24 WAY DIL SOCKET 605102.
J2 16 WAY DIL SOCKET 605002 CLIP 606005
24 WAY CABLE ASSY 573120/C. SOLDER END WITHOUT CABLE CLIP TO P.C.B.
J1
J2
J3
C3
+
AN1
TP1
MOUNT M1, M2 AND M3 ON 24 WAY DIL. SOCKET 605064 3 OFF
R5
C8
C12
M1
23
SLEEVE R8 LEAD WITH PTFE SLEEVE 590004.
R8
C2
C1
+
M9
J5
J6
C14
M6
M3
M8
22 SWG BTC WIRE 540002 SLEEVE. PTFE 590004
LINK A 1065 ONLY
LINK B 1061 1071 1081
B
A
TP4
C17
C15
C11
TP5
C4
+
M2
C13
C6
C5
+
+
R3
R2
R4
M10
M11
R7
C10
M12
C16
M13
MOUNT M8, M11-M13 ON 14 WAY DIL SOCKETS 605060 4 OFF.
TP3
R6
C9
R1
C7
TP2
P.C.B 410165-4A
MOUNT M9 ON 40 WAY DIL SOCKET 605050
MOUNT M6 AND M10 ON 16 WAY DIL SOCKETS 605061 2 OFF
TESTPOINT TERMINALS 620007 5 OFF.

ISS.	CHANGES
9	ECO. 1538.1588 3 NYLATCHES REMOVED. P.C.B WAS ISS 2 C7 WAS 10µF TANT C2 WAS 10nF CD. C11-C17 ADDED. IL 28.2.84
10	ECO 1681 R8 ADDED. BJ. 26-7-84.

IEEE 488 / 6P13 PCB

DRAWN JR	DATE 5·10·83	DIMENSIONS IN MILLIMETRES	METRIC DIMENSIONS ANGULAR ± ½° DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm UNLESS OTHERWISE STATED	MATERIAL —	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
CHKD.	DATE	SCALE 2:1 NOT TO BE SCALED		FINISH —	TITLE IEEE P.C.B ASSY 1065 1061 1071 1081	DRAWING No. 400427	SHEET 1 OF 5
APPD.	DATE					

J.W. 2042

DRAWING No.	430503
FIRST USED ON	1081

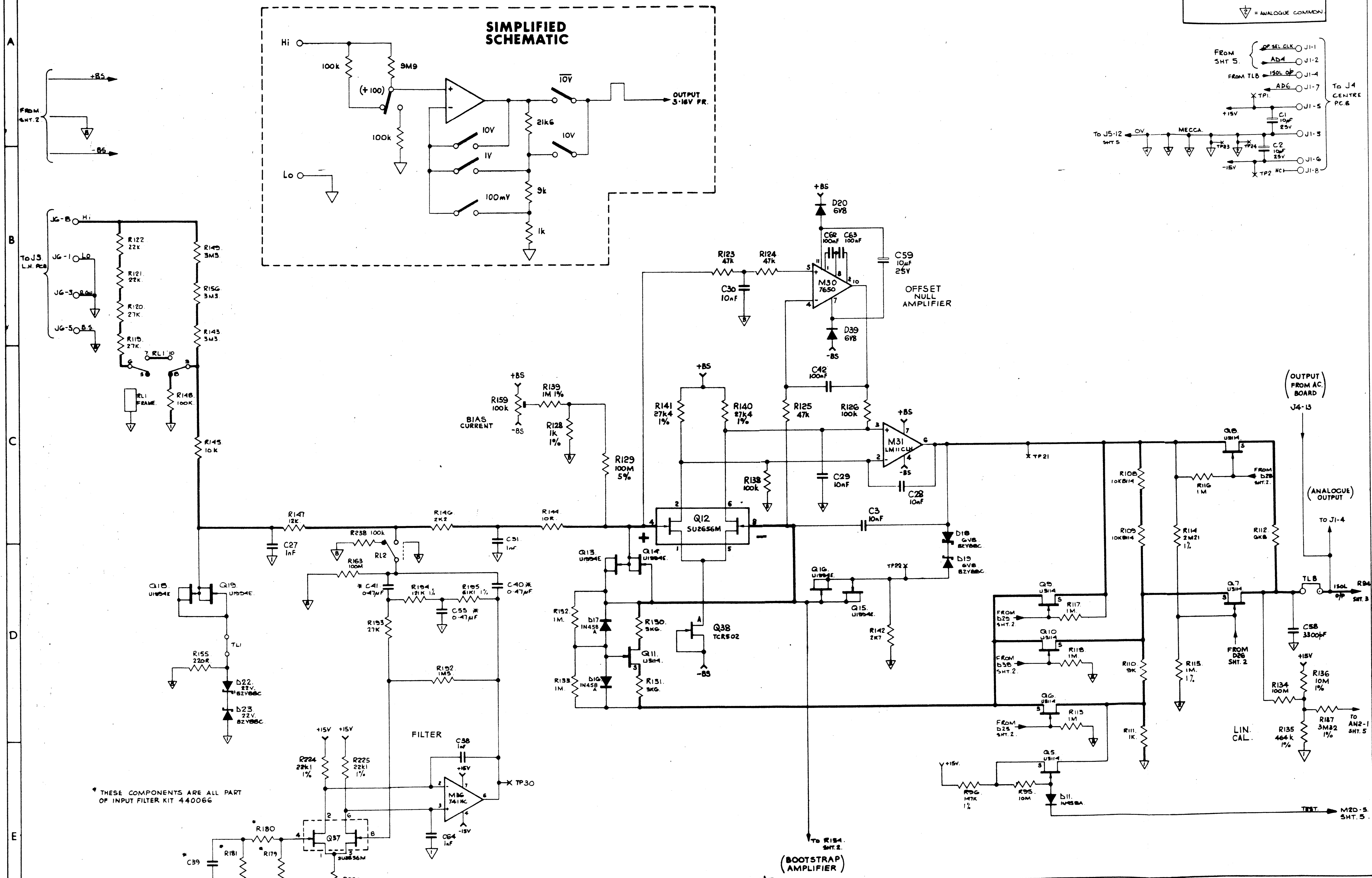
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED 31.3.83



= SIGNAL COMMONS
= ANALOGUE COMMON
SIMPLIFIED SCHEMATIC
Hi
Lo
100k
9M9
(÷100)
100k
10V
OUTPUT 3-16V FR.
21k6
10V
1V
100mV
9k
1k
+BS
-BS
FROM SHT. 2
To J3 L.H. PCB
J6-8 Hi
J6-1 Lo
J6-3
J6-5 BS
R122 22K
R121 22K
R120 27K
R119 27K
R149 3M3
R156 3M3
R143 3M3
RL1 FRAME
R148 100K
R145 10K
R147 12K
C27 1nF
R238 100k
RL2
R163 100M
R146 2K2
C31 1nF
R144 10R
C41 0.47µF
R194 121K 1%
R195 61K1 1%
C40 0.47µF
C55 0.47µF
R193 27K
R192 1M5
Q18 U1994E
Q19 U1994E
TL1
R155 220R
D22 22V BZY88C
D23 22V BZY88C
THESE COMPONENTS ARE ALL PART OF INPUT FILTER KIT 440066
FILTER
C38 1nF
M36 741HC
+15V
-15V
TP30
R224 22k1 1%
R225 22k1 1%
C64 1nF
R180
Q37
SU2656M
R181
R179
C39
R226 22k
+BS
R159 100k
R139 1M 1%
BIAS CURRENT
R128 1k 1%
R129 100M 5%
R141 27k4 1%
R140 27k4 1%
Q12 SU2656M
Q13 U1994E
Q14 U1994E
R152 1M
D17 1N458A
D16 1N458A
R133 1M
R130 5K6
R131 5K6
Q11 U3114
Q38 TCR502
R123 47k
R124 47k
C30 10nF
C62 100nF
C63 100nF
C59 10µF 25V
M30 7650
D20 6V8
D39 6V8
OFFSET NULL AMPLIFIER
C42 100nF
R125 47k
R126 100k
M31 LM11CLH
R138 100k
C29 10nF
C28 10nF
C3 10nF
D18 6V8 BZY88C
D19 6V8 BZY88C
TP22
Q16 U1994E
Q15 U1994E
R142 2K7
TO R154 SHT. 2
(BOOTSTRAP AMPLIFIER)
TP21
R108 10K8114
R109 10K8114
Q8 U3114
R116 1M
FROM D28 SHT. 2
R114 2M21 1%
R112 6K8
(OUTPUT FROM AC BOARD) J4-13
(ANALOGUE OUTPUT)
TO J1-4
Q9 U3114
R117 1M
FROM D29 SHT. 2
Q10 U3114
R118 1M
FROM D38 SHT. 2
Q6 U3114
R113 1M
FROM D25 SHT. 2
R110 9K
R111 1K
R115 1M 1%
Q7 U3114
FROM D26 SHT. 2
TL8
ISOL O/P
R94 SHT. 3
C58 3300pF
+15V
R134 100M
R136 10M 1%
R137 3M32 1%
TO AN2-1 SHT. 5
LIN. CAL.
R135 464k 1%
Q5 U3114
R96 147K 1%
R95 10M
D11 1N458A
TEST
M20-5 SHT. 5
FROM SHT 5.
OP SEL CLK
AD4
FROM TLB
ISOL O/P
ADG
J1-1
J1-2
J1-4
J1-7
TP1
J1-5
C1 10µF 25V
To J4 CENTRE PCB
To J5-12 SHT. 5
0V
MECCA
TP23
TP24
C2 10µF 25V
J1-3
J1-6
-15V
TP2
NC
J1-8

DRAWN	CHECKED	DIMENSIONS IN
IL	L.O.G.	MILLIMETRES
TRACED	APPROVED	SCALE
	RWF	
DATE	DATE	
25.1.83	31-3-83	NOT TO BE SCALED

TOLERANCES [illegible]

datron ELECTRONICS LTD. NORWICH.

TITLE	DRAWING SIZE	
DC ISOLATOR. 1081	A1	
	DRAWING No. 430503	SHEET 1 OF 5

DC ISOLATOR

1	2	3	4	5	6	7	ISS.	CHANGES
							1	RELEASED. 31.3.83

DRAWING No.
430503
FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

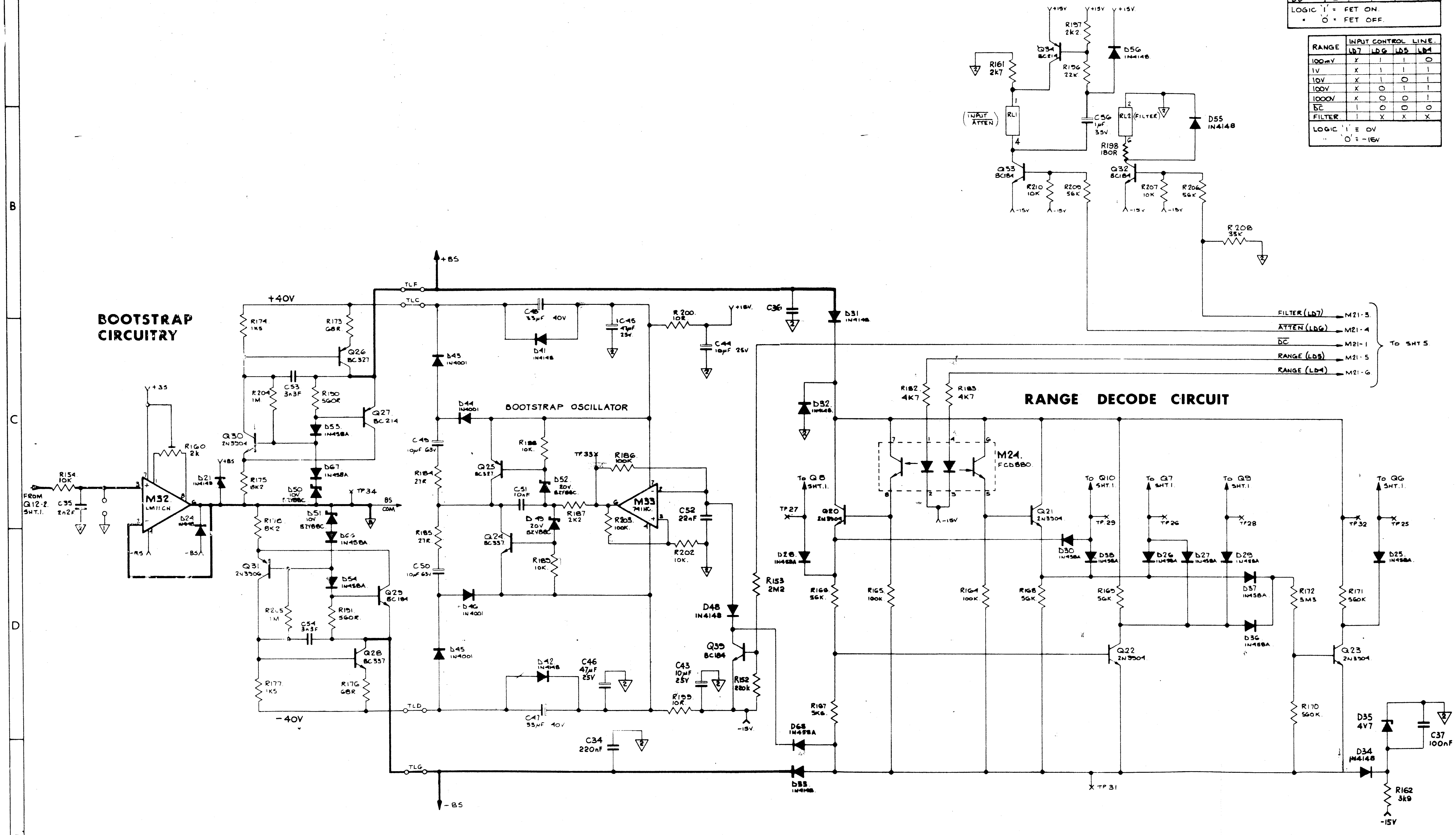
NOTES

RANGE	FET CONTROL LINE.				
	TP. 25	TP. 26	TP. 27	TP. 28	TP. 29
100 mV	1	0	1	0	0
1V	0	0	1	0	1
10V	0	1	0	1	0
100V	0	0	1	0	1
1000V	0	1	0	1	0
$\overline{DC}$	0	0	0	1	0

LOGIC '1' = FET ON.
" '0' = FET OFF.

RANGE	INPUT CONTROL LINE.			
	LD7	LD6	LD5	LD4
100mV	X	1	1	0
1V	X	1	1	1
10V	X	1	0	1
100V	X	0	1	1
1000V	X	0	0	1
$\overline{DC}$	1	0	0	0
FILTER.	1	X	X	X

LOGIC '1' ≡ 0V
" '0' ≡ -15V



BOOTSTRAP CIRCUITRY
BOOTSTRAP OSCILLATOR
RANGE DECODE CIRCUIT
+40V
-40V
+BS
-BS
BS COM
TLF
TLC
TLD
TLG
FROM Q12-2 SHT.1.
R154 10K
C35 2n2F
M32 LM11CN
R160 2k
D21 IN4148
D24 IN4148
Q30 2N3504
Q31 2N3506
R174 1K5
R173 68R
Q26 BC327
Q27 BC214
R204 1M
C53 3n3F
R150 560R
D53 IN458A
D67 IN458A
D50 10V BZY88C
D51 10V BZY88C
D66 IN458A
D54 IN458A
R175 8K2
R178 8K2
TP34
R205 1M
C54 3n3F
R151 560R
Q29 BC184
Q28 BC337
R177 1K5
R176 68R
C48 33µF 40V
D41 IN4148
C45 47µF 25V
D43 IN4001
D44 IN4001
C49 10µF 63V
C50 10µF 63V
R184 27K
R185 27K
Q25 BC327
Q24 BC337
R188 10K
R189 10K
C51 10nF
D52 20V BZY88C
D49 20V BZY88C
R187 2K2
TP35
R186 100K
M33 741C
R203 100K
C52 22nF
R202 10K
D46 IN4001
D45 IN4001
D42 IN4148
C46 47µF 25V
C47 33µF 40V
C34 220nF
R200 10R
C44 10µF 25V
C36
D31 IN4148
D32 IN4148
D48 IN4148
Q39 BC184
C43 10µF 25V
R152 220k
R199 10R
R153 2M2
-15V
+15V
D68 IN458A
D33 IN4148
R197 5K6
Q20 2N3504
Q21 2N3504
Q22 2N3504
Q23 2N3504
TP27
TP29
TP26
TP28
TP32
TP25
TP31
To Q8 SHT.1.
To Q10 SHT.1
To Q7 SHT.1
To Q9 SHT.1
To Q6 SHT.1.
D28 IN458A
D30 IN458A
D38 IN458A
D26 IN458A
D27 IN458A
D29 IN458A
D25 IN458A
D37 IN458A
D36 IN458A
M24. FCD880
R182 4K7
R183 4K7
R166 56K
R165 100K
R164 100K
R168 56K
R169 56K
R172 3M3
R171 560K
R170 560K
D35 4V7
D34 IN4148
C37 100nF
R162 3k9
FILTER (LD7) — M21-3
ATTEN (LD6) — M21-4
DC — M21-1
RANGE (LD5) — M21-5
RANGE (LD4) — M21-6
To SHT 5
R157 2k2
Q34 BC214
D56 IN4148
R161 2k7
R156 22K
(INPUT ATTEN)
RL1
C56 1µF 35V
RL2 (FILTER)
D55 IN4148
R198 180R
Q33 BC184
Q32 BC184
R210 10K
R209 56K
R207 10K
R206 56K
R208 33K

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES
IL	L.O.G.	MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES + DECIMAL TO 2 PLACES + FRACTIONAL + 1/64 ANGULAR +
TRACED	APPROVED RWF	SCALE	METRIC DIMENSIONS DECIMAL TO 2 PLACES + DECIMAL TO 1 PLACE + 2mm WHOLE DIMENSIONS + 4mm UNLESS OTHERWISE STATED
DATE 25.1.83	DATE 31-3-83	NOT TO BE SCALED	

MATERIAL ——

FINISH ——

datron ELECTRONICS LTD. NORWICH.

TITLE
Boot strapped supplies & range logic 1081

DRAWING No. 430503

DRAWING SIZE A1

SHEET 2 OF 5

BOOTSTRAPPED SUPPLIES + RANGE LOGIC

DRAWING No.
430503
FIRST USED ON

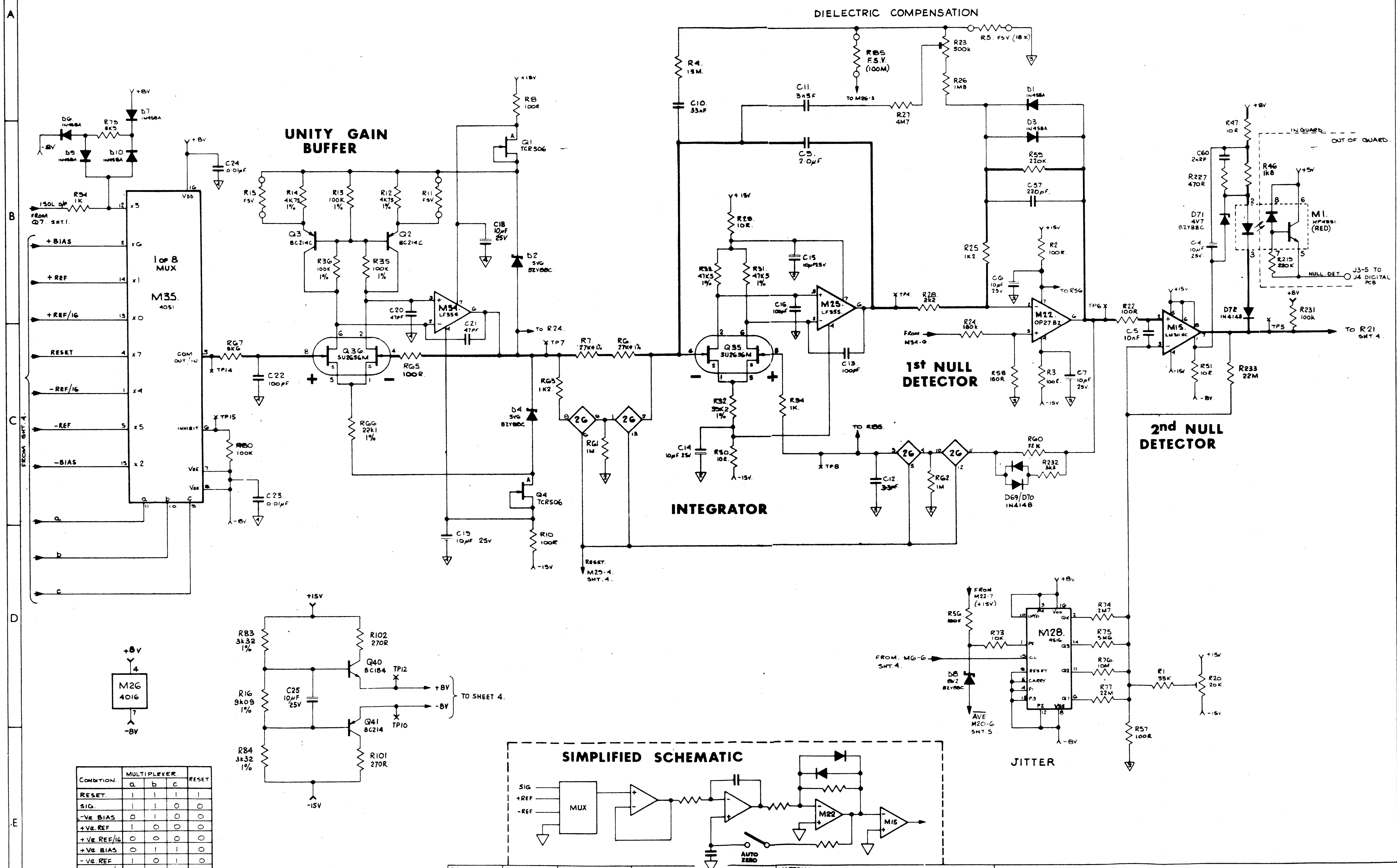
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED 31.3.83


DIELECTRIC COMPENSATION
UNITY GAIN BUFFER
INTEGRATOR
1st NULL DETECTOR
2nd NULL DETECTOR
JITTER
SIMPLIFIED SCHEMATIC
+8V
D7 IN458A
D6 IN458A
R79 5K9
-8V
D9 IN458A
D10 IN458A
R94 1K
ISOL o/p
FROM Q7. SHT.1.
+BIAS
+REF
+REF/16
RESET
-REF/16
-REF
-BIAS
FROM SHT.4.
a
b
c
x3
x6
x1
x0
x7
x4
x5
x2
VDD
1 OF 8 MUX
M35.
4051
COM OUT/IN
INHIBIT
VEE
VSS
C24 0.01µF
R67 5K6
TP14
C22 100pF
TP15
R80 100K
C23. 0.01µF
-8V
R15 FSV
R14 4K75 1%
R13 100K 1%
R12 4K75 1%
R11 FSV
Q3 BC214C
Q2 BC214C
R36 100K 1%
R35 100K 1%
+15V
R8 100R
Q1 TCR506
C18 10µF 25V
D2 5V6 BZY88C
C20 47pF
M34. LF356
C21 47pF
TO R24.
Q36 SU2656M
+
-
R65 100R
R66 22k1 1%
D4 5V6 BZY88C
Q4 TCR506
C19 10µF 25V
R10 100R
-15V
TP7
R7 27K4 1%
R6 27K4 1%
R63 1K2
26
R61 1M
RESET. M29-4. SHT.4.
R4. 15M.
C10. 33nF
R85 F.S.V. (100M)
TO M26-3
C11. 3n3F
R27 4M7
R23 500k
R5. FSV (18K)
R26 1M8
C9. 2.0µF
+15V
R29. 10R.
C15 10µF 25V
R33 47K5 1%
R31. 47K5 1%
C16 100pF
M25. LF355.
C13 100pF
Q35 SU2656M
R32 35K2 1%
R34 1K.
C14 10pF 25V
R30 10R.
TO R85.
TP8
C12 3.3nF
R62 1M
TP4
R28 2k2
R24 180k
FROM M34-6
D1 IN458A
D3 IN458A
R59 220K
C57 220pF.
R25 1K2
C6 10µF 25V
R2 100R.
TO R56
M22. OP27BZ
R58 160R
R3. 100R.
C7 10µF 25V.
R60 22K
R232 3k3
D69/D70 IN4148
TP6
R22 100R
C5 10nF
M15. LM311NC
R51 10R
R233 22M
R47. 10R
C60 2n2F
R227 470R
D71 4V7 BZY88C
C4 10µF 25V.
IN GUARD.
OUT OF GUARD.
R46 1k8
+5V
M1. HP4N51 (RED)
R219 220K
NULL DET.
J3-5 TO J4 DIGITAL PCB
D72 IN4148
TP5
R231 100k
TO R21 SHT.4.
FROM M22-7 (+15V)
R56 180K
R73 10K
FROM. M6-6 SHT.4.
D8 8V2 BZY88C
AVE M20-6 SHT.5
M28. 4516
UP/D
P4
PE
CL
RESET
CARRY
P1
P3
P2
Q4
Q3
Q2
Q1
R74 2M7
R75 5M6
R76. 10M
R77 22M
R1 33K
R20 20K
R57 100R
M26 4016
R83 3k32 1%
R102 270R
Q40 BC184
TP12
R16 9k09 1%
C25 10µF 25V
Q41 BC214
TP10
R84 3k32 1%
R101 270R
+8V
-8V
TO SHEET 4.
SIG
+REF
-REF
MUX
M22
M15
AUTO ZERO

CONDITION.	MULTIPLEXER.			RESET
	a	b	c	
RESET.	1	1	1	1
SIG.	1	1	0	0
-Ve BIAS	0	1	0	0
+Ve. REF	1	0	0	0
+Ve. REF/16	0	0	0	0
+Ve BIAS	0	1	1	0
-Ve. REF	1	0	1	0
-Ve. REF/16	0	0	1	0

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
IL	L.O.G.	MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	——
TRACED	APPROVED RWF	SCALE	ANGULAR ±°	FINISH ——
DATE 25.1.83	DATE 31-3-83	NOT TO BE SCALED		

datron ELECTRONICS LTD. NORWICH.

TITLE
A-D CONVERTOR 1081

DRAWING SIZE
A1

DRAWING No.
430503

SHEET
3 OF 5

ADC

DRAWING No. 430503

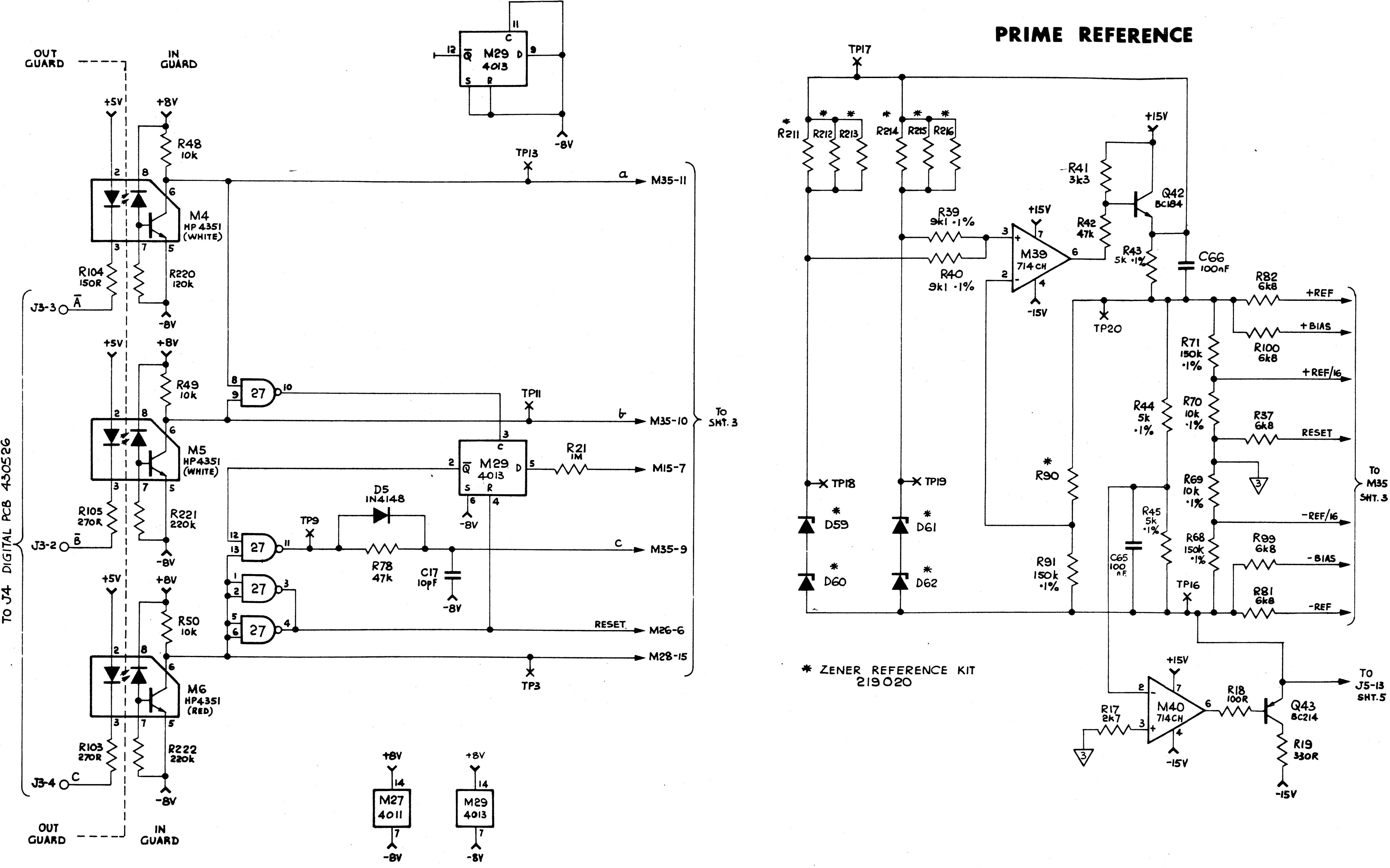
FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES


OUT GUARD
IN GUARD
+5V
+8V
-8V
R48 10k
R49 10k
R50 10k
M4 HP 4351 (WHITE)
M5 HP4351 (WHITE)
M6 HP4351 (RED)
R104 150R
R105 270R
R103 270R
R220 120k
R221 220k
R222 220k
J3-3 Ā
J3-2 B̄
J3-4 C
TO J4 DIGITAL PCB 430526
M29 4013
TP13
TP11
TP9
TP3
a
b
c
M35-11
M35-10
M35-9
M15-7
RESET
M26-6
M28-15
TO SHT. 3
27
D5 1N4148
R78 47k
C17 10pF
R21 1M
M27 4011
M29 4013
PRIME REFERENCE
TP17
R211
R212
R213
R214
R215
R216
R39 9k1 ·1%
R40 9k1 ·1%
M39 714CH
+15V
-15V
R41 3k3
R42 47k
R43 5k ·1%
Q42 BC184
C66 100nF
TP20
R82 6k8
+REF
R100 6k8
+BIAS
R71 150k ·1%
+REF/16
R70 10k ·1%
R37 6k8
RESET
R44 5k ·1%
R69 10k ·1%
-REF/16
R45 5k ·1%
C65 100nF
R68 150k ·1%
R99 6k8
-BIAS
R81 6k8
-REF
TP16
R90
R91 150k ·1%
TO M35 SHT. 3
TP18
TP19
D59
D60
D61
D62
* ZENER REFERENCE KIT 219020
M40 714CH
R17 2k7
R18 100R
Q43 BC214
R19 330R
TO J5-13 SHT. 5

DRAWN IL	DATE 26.1.83	DIMENSIONS IN MILLIMETRES	METRIC DIMENSIONS ANGULAR ± ½° DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD., NORWICH.
CHKD. L.O.G.	DATE 11.2.83	SCALE		FINISH	TITLE A-D CONTROL + REFERENCES 1081
APPD. RWE	DATE 31-3-83	NOT TO BE SCALED			DRAWING No. 430503

DRAWING SIZE A2

SHEET 4 OF 5

ADC CONTROL + REFERENCE SUPPLY

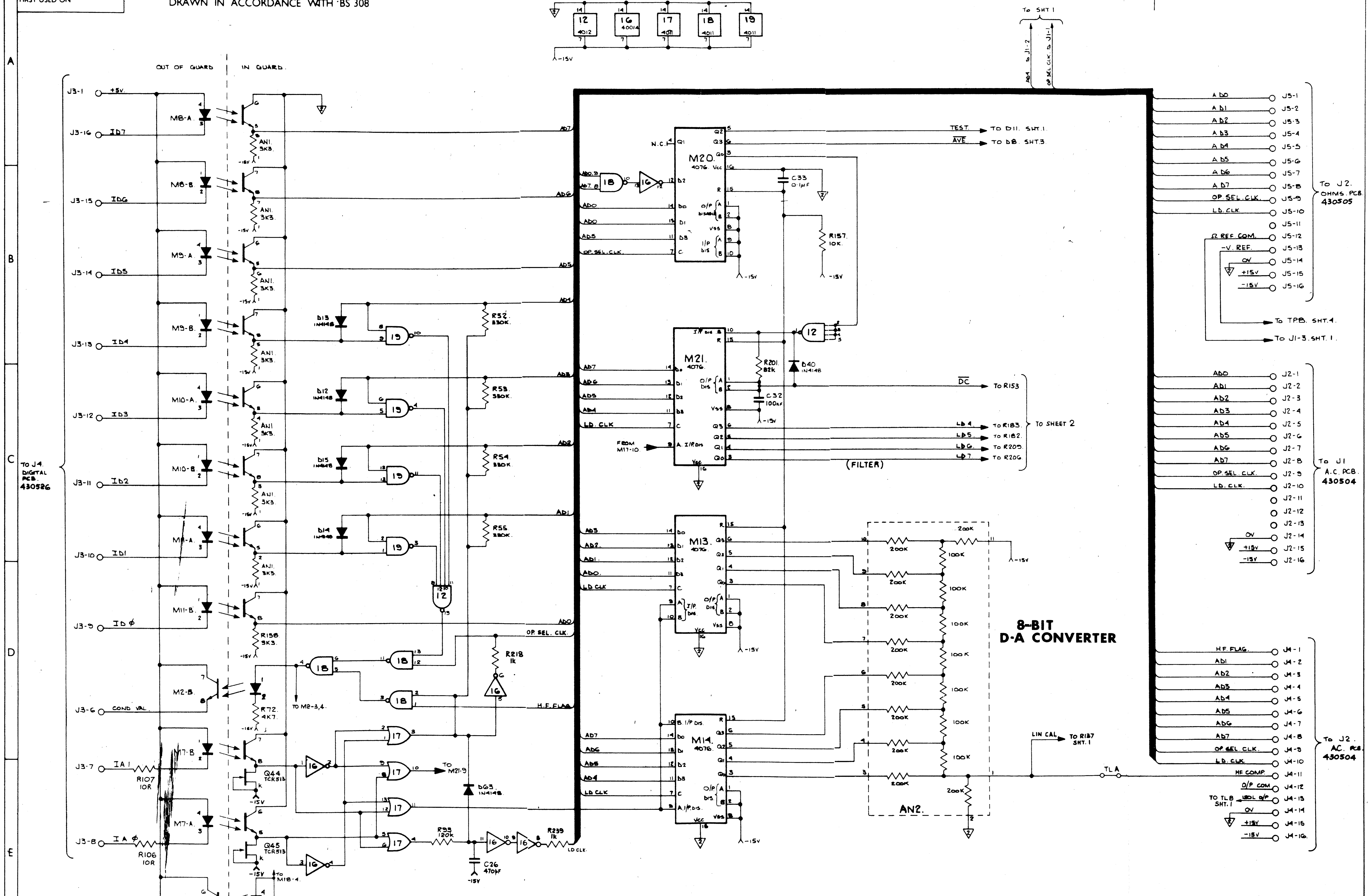
DRAWING No.
430503
FIRST USED ON

THIRD ANGLE PROJECTION
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED 31.3.83


OUT OF GUARD
IN GUARD
J3-1 +5V
J3-16 ID7
J3-15 ID6
J3-14 ID5
J3-13 ID4
J3-12 ID3
J3-11 ID2
J3-10 ID1
J3-9 ID0
J3-6 COND VAL.
J3-7 IA1
J3-8 IA0
TO J4. DIGITAL PCB. 430526
M8-A
M8-B
M9-A
M9-B
M10-A
M10-B
M11-A
M11-B
M2-B
M7-B
M7-A
M2-A
AN1 3K3
R158 3K3
R72 4K7
R107 10R
R106 10R
Q44 TCR513
Q45 TCR513
-15V
D13 1N4148
D12 1N4148
D15 1N4148
D14 1N4148
D63 1N4148
D40 1N4148
R52 330K
R53 330K
R54 330K
R55 330K
R218 1k
R95 120K
R239 1k
C26 470pF
TO M2-3,4.
TO M21-9
TO M18-4
OP. SEL. CLK.
H.F. FLAG
LD CLK
M20. 4076
M21. 4076
M13. 4076
M14. 4076
N.C.
TEST
AVE
TO D11. SHT.1
TO D8 SHT.3
C33 0.1μF
R157 10K
R201 82K
C32 100nF
DC
TO R153
TO R183
TO R182
TO R205
TO R206
TO SHEET 2
(FILTER)
FROM M17-10
A. Z/RDn
To SHT 1
AD4 to J1-2
OP SEL CLK. to J1-1
4012
4001A
4011
4011
4011
8-BIT D-A CONVERTER
AN2.
200K
100K
LIN CAL
TO R137 SHT. 1
TLA
A D0
A D1
A D2
A D3
A D4
A D5
A D6
A D7
OP. SEL. CLK.
LD. CLK.
Ω REF COM.
-V. REF.
0V
+15V
-15V
J5-1
J5-2
J5-3
J5-4
J5-5
J5-6
J5-7
J5-8
J5-9
J5-10
J5-11
J5-12
J5-13
J5-14
J5-15
J5-16
To J2. OHMS PCB 430505
To TP8. SHT.4
To J1-3. SHT. 1
J2-1
J2-2
J2-3
J2-4
J2-5
J2-6
J2-7
J2-8
J2-9
J2-10
J2-11
J2-12
J2-13
J2-14
J2-15
J2-16
To J1 A.C. PCB. 430504
H.F. FLAG.
HF COMP
O/P COM
UNDL O/P
TO TL8 SHT. 1
J4-1
J4-2
J4-3
J4-4
J4-5
J4-6
J4-7
J4-8
J4-9
J4-10
J4-11
J4-12
J4-13
J4-14
J4-15
J4-16
To J2. AC. PCB. 430504

ANALOG INTERFACE

DRAWN	CHECKED
IL	L.O.G.
TRACED	APPROVED
	RWF
DATE	DATE
25.1.83	31-3-83

DIMENSIONS IN MILLIMETRES
SCALE
NOT TO BE SCALED

TOLERANCES ANGULAR + °
INCH DIMENSIONS
DECIMAL TO 3 PLACES + .005
DECIMAL TO 2 PLACES + .010
FRACTIONAL + 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES + 1mm
DECIMAL TO 1 PLACE + 2mm
WHOLE DIMENSIONS + 4mm
UNLESS OTHERWISE STATED

MATERIAL ——
FINISH ——

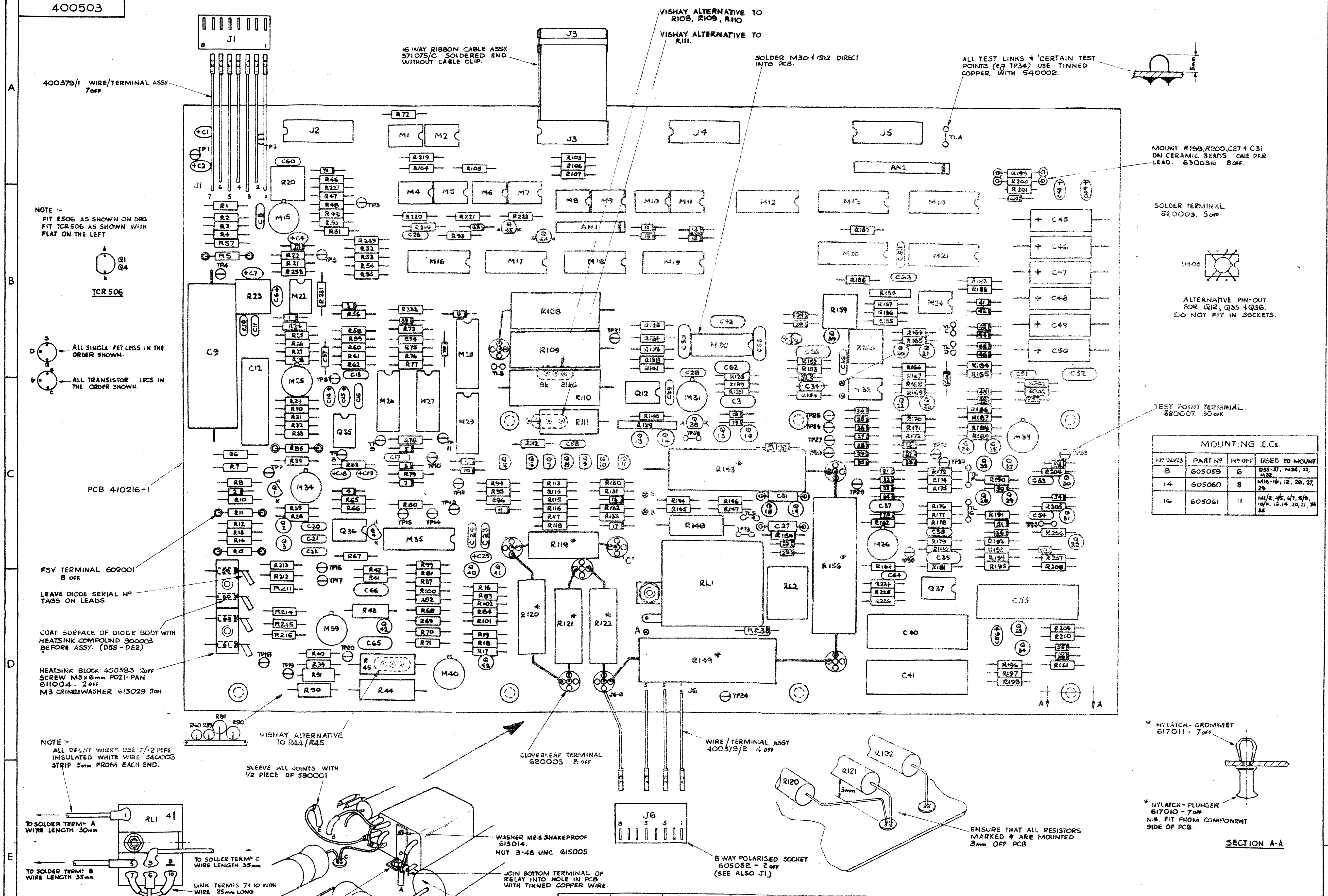
datron ELECTRONICS LTD. NORWICH.

TITLE
ANALOGUE INTERFACE LOGIC 1081

DRAWING SIZE A1
DRAWING No. 430503
SHEET [illegible]

ISS.	CHANGES
B	
1	RELEASED. 21.3.

DRAWING No. 400503


1
2
3
4
5
6
7
A
B
C
D
E
J1
J2
J3
J4
J5
J6
AN1
AN2
M1
M2
M4
M5
M6
M7
M8
M9
M10
M11
M12
M13
M14
M16
M17
M18
M19
M20
M21
M15
M22
M24
M25
M26
M27
M28
M29
M30
M31
M32
M33
M34
M35
M36
M39
M40
C9
C12
C40
C41
C45
C46
C47
C48
C49
C50
C55
R108
R109
R110
R111
R119
R120
R121
R122
R143
R148
R149
R156
RL1
RL2
Q12
Q35
Q36
Q37
R44
R90
R91
R40
R39
RL1
A

400379/1 WIRE/TERMINAL ASSY 7OFF

16 WAY RIBBON CABLE ASSY. 571075/C SOLDERED END WITHOUT CABLE CLIP.

VISHAY ALTERNATIVE TO R108, R109, R110

VISHAY ALTERNATIVE TO R111.

SOLDER M30 & Q12 DIRECT INTO PCB.

ALL TEST LINKS & 'CERTAIN TEST POINTS (e.g. TP34) USE TINNED COPPER WITH 540002.

5mm

MOUNT R199, R200, C27 & C31 ON CERAMIC BEADS ONE PER LEAD. 630036 8OFF.

SOLDER TERMINAL 620003. 5OFF

U404

ALTERNATIVE PIN-OUT FOR Q12, Q35 & Q36. DO NOT FIT IN SOCKETS.

NOTE :-
FIT E506 AS SHOWN ON DRG
FIT TCR506 AS SHOWN WITH FLAT ON THE LEFT

Q1 Q4

TCR 506

ALL SINGLE FET LEGS IN THE ORDER SHOWN.

ALL TRANSISTOR LEGS IN THE ORDER SHOWN.

PCB 410216-1

TEST POINT TERMINAL 620007. 30OFF.

MOUNTING I.Cs.			
Nº WAYS	PART Nº	Nº OFF	USED TO MOUNT
8	605059	6	Q35-37, M24, 22, M32.
14	605060	8	M16-19, 12, 26, 27, 29
16	605061	11	M1/2, ~~4~~/5, 6/7, 8/9, 10/11, 13, 14, 20, 21, 28 35

FSY TERMINAL 602001 8 OFF

LEAVE DIODE SERIAL Nº TAGS ON LEADS

COAT SURFACE OF DIODE BODY WITH HEATSINK COMPOUND 300003 BEFORE ASSY. (D59 - D62)

HEATSINK BLOCK 450383 2OFF
SCREW M3×6mm POZI-PAN 611004. 2OFF
M3 CRINKLEWASHER 613029 2OFF

VISHAY ALTERNATIVE TO R44/R45.

CLOVERLEAF TERMINAL 620005 8OFF

WIRE/TERMINAL ASSY 400379/2 4OFF

8 WAY POLARISED SOCKET 605052 - 2OFF (SEE ALSO J1.)

ENSURE THAT ALL RESISTORS MARKED * ARE MOUNTED 3mm OFF PCB.

* NYLATCH-GROMMET 617011 - 7OFF

* NYLATCH-PLUNGER 617010 - 7OFF
N.B. FIT FROM COMPONENT SIDE OF PCB.

SECTION A-A

NOTE :-
ALL RELAY WIRES USE 7/·2 PTFE INSULATED WHITE WIRE 540008 STRIP 5mm FROM EACH END.

TO SOLDER TERMª A WIRE LENGTH 30mm

TO SOLDER TERMª B WIRE LENGTH 35mm

TO SOLDER TERMª C WIRE LENGTH 35mm

LINK TERMªS 7 & 10 WITH WIRE 25mm LONG & SLEEVE AS SHOWN

TO SOLDER TERMª E WIRE LENGTH 40mm

SLEEVE ALL JOINTS WITH 1/2 PIECE OF 590001

WASHER M2·5 SHAKEPROOF 613014.
NUT 3·48 UNC 615005

JOIN BOTTOM TERMINAL OF RELAY INTO HOLE IN PCB WITH TINNED COPPER WIRE.

RELAY BRACKET 459112

SECURE RELAY BRACKET TO PCB USING M3×6mm POZI-PAN SCREW 611004 M3 SHAKEPROOF WASHER 613005 M3 FULL NUT 615002

VIEW IN DIRECTION OF ARROW

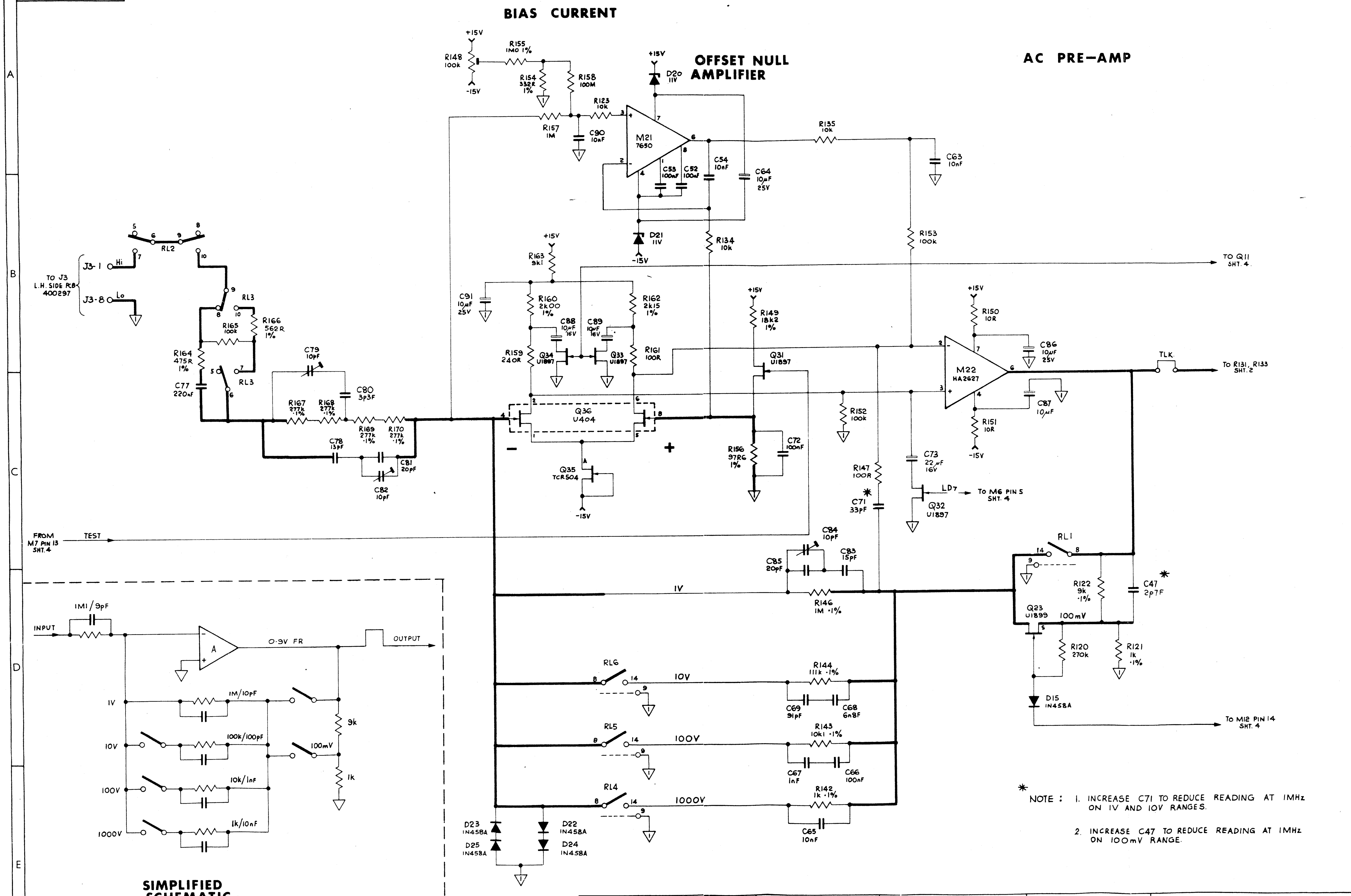
E.B.W.

DRAWN IL	DATE 1. 12. 82	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm ANGULAR ± ½°	MATERIAL	ASSY DRG & PARTS LIST 400503	TITLE	datron ELECTRONICS LIMITED NORWICH
CHECKED doG	DATE 9-2-83	SCALE 2:1	UNLESS OTHERWISE STATED	FINISH	CIRCUIT DIAGRAM 430503	1081 ANALOGUE P.C.B. ASSY.	DRAWING No. 400503
APPR. RWF	DATE 31-3-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION		CHECK PROCEDURE 460503 CHECK LIST 470503		SHEET 1 OF 24

ANALOG PCB

DRAWING No.
430504

ISS.	CHANGES
1	RELEASED. 12.4.83
2	ECO 1485 SEE SHEET 2 BJ.



1 2 3 4 5 6 7
A B C D E
BIAS CURRENT
OFFSET NULL AMPLIFIER
AC PRE-AMP
+15V
-15V
R148 100k
R155 1MO 1%
R154 332R 1%
R158 100M
R157 1M
R123 10k
C90 10nF
D20 11V
M21 7650
C53 100nF
C52 100nF
C54 10nF
C64 10µF 25V
D21 11V
R134 10k
R135 10k
C63 10nF
R153 100k
TO Q11 SHT. 4
RL2
TO J3 L.H. SIDE PCB 400297
J3-1 Hi
J3-8 Lo
RL3
R165 100k
R166 562R 1%
R164 475R 1%
C77 220nF
C79 10pF
C80 3p3F
R167 277k ·1%
R168 277k ·1%
R189 277k ·1%
R170 277k ·1%
C78 13pF
C81 20pF
C82 10pF
R163 9k1
C91 10µF 25V
R160 2k00 1%
R162 2k15 1%
C88 10µF 16V
C89 10µF 16V
R159 240R
Q34 U1897
Q33 U1897
R161 100R
Q36 U404
Q35 TCR504
R149 18k2 1%
Q31 U1897
R156 97R6 1%
C72 100nF
R150 10R
C86 10µF 25V
M22 HA2627
C87 10µF
R151 10R
R152 100k
R147 100R
C71 33pF
C73 22µF 16V
LD7
To M6 PIN 5 SHT. 4
Q32 U1897
TLK.
To R131, R133 SHT. 2
FROM M7 PIN 13 SHT. 4
TEST
C84 10pF
C85 20pF
C83 15pF
IV
R146 1M ·1%
RL1
R122 9k ·1%
C47 2p7F
Q23 U1899
100mV
R120 270k
R121 1k ·1%
D15 IN458A
To M12 PIN 14 SHT. 4
RL6
10V
R144 111k ·1%
C69 91pF
C68 6n8F
RL5
100V
R143 10k1 ·1%
C67 1nF
C66 100nF
RL4
1000V
R142 1k ·1%
C65 10nF
D23 IN458A
D25 IN458A
D22 IN458A
D24 IN458A
SIMPLIFIED SCHEMATIC
INPUT
1M1/9pF
A
0·9V FR
OUTPUT
IV
1M/10pF
10V
100k/100pF
100V
10k/1nF
1000V
1k/10nF
9k
100mV
1k

* NOTE : 1. INCREASE C71 TO REDUCE READING AT 1MHz ON IV AND 10V RANGES.

2. INCREASE C47 TO REDUCE READING AT 1MHz ON 100mV RANGE.

AC PREAMP

DRAWN IL	DATE 18. 1. 83	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm ANGULAR ± ½°	MATERIAL	ASSY DRG & PARTS LIST 400504
CHECKED L.O.G.	DATE 11.2.83	SCALE	UNLESS OTHERWISE STATED	FINISH	CIRCUIT DIAGRAM
APPR. R.W.F.	DATE 12-4-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION		CHECK PROCEDURE 460504 CHECK LIST 470504

TITLE 1081 AC PRE-AMP

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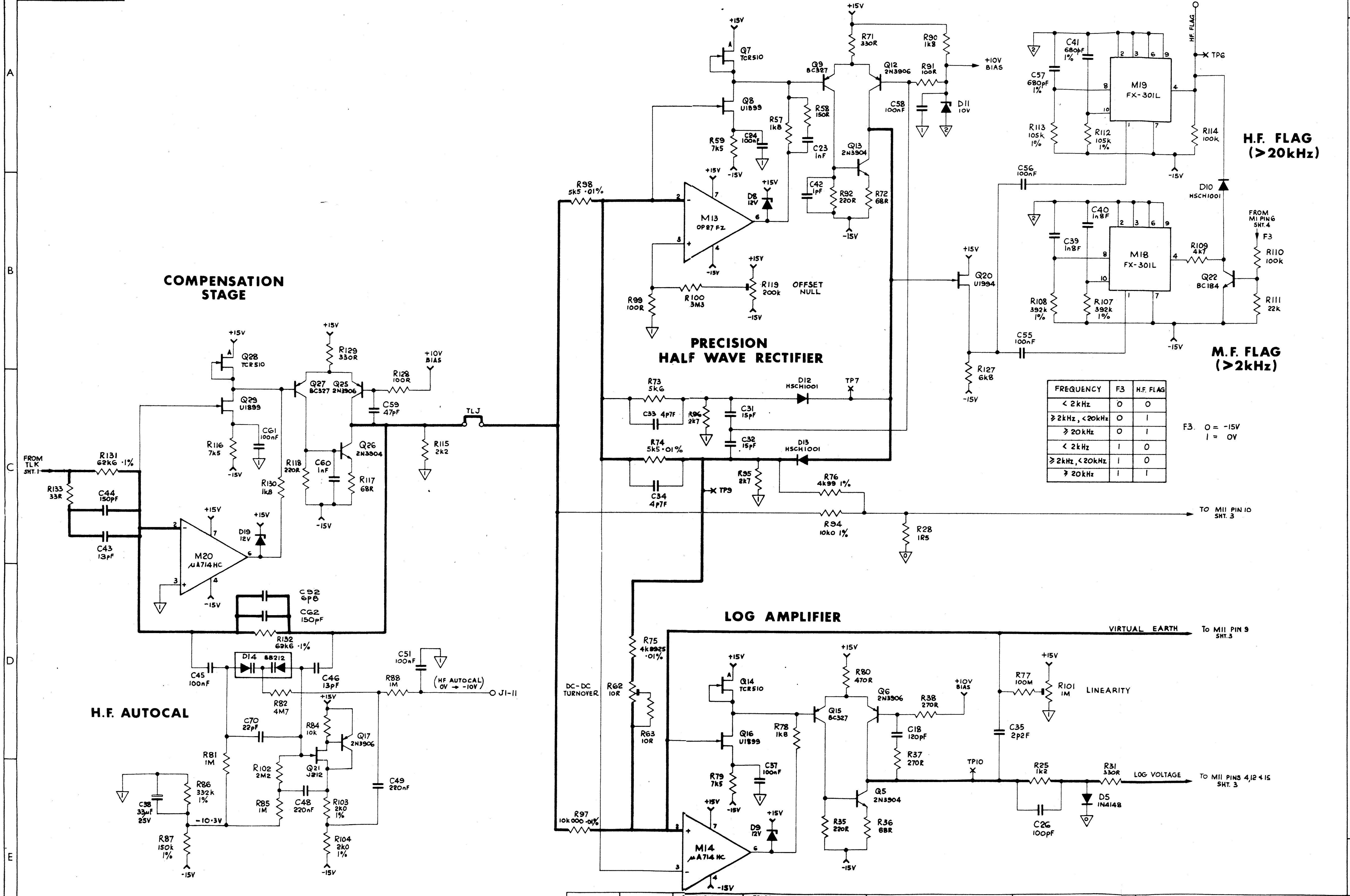
LIMITED
NORWICH

DRAWING No. 430504

SHEET 1 OF 4

DRAWING No. 430504



COMPENSATION STAGE
FROM TLK SHT. 1
R131 62k6 ·1%
R133 33R
C44 150pF
C43 13pF
M20 µA714HC
+15V
-15V
D19 12V
Q28 TCR510
Q29 U1899
R116 7k5
C61 100nF
Q27 BC327
Q25 2N3906
R129 330R
R128 100R
+10V BIAS
C59 47pF
R118 220R
C60 1nF
Q26 2N3904
R117 68R
R130 1k8
R115 2k2
TLJ
C92 6p8
C62 150pF
R132 69k6 ·1%
H.F. AUTOCAL
D14 SB212
C45 100nF
C46 13pF
R82 4M7
C51 100nF
R88 1M
(HF AUTOCAL) 0V → -10V
J1-11
C70 22pF
R84 10k
Q17 2N3906
Q21 J212
R81 1M
R102 2M2
R85 1M
C48 220nF
R103 2k0 1%
R104 2k0 1%
C49 220nF
R86 332k 1%
C38 33µF 25V
R87 150k 1%
-10·3V
PRECISION HALF WAVE RECTIFIER
R98 5k5 ·01%
M13 OP87 FZ
D8 12V
Q7 TCR510
Q8 U1899
R59 7k5
C24 100nF
R57 1k8
R58 150R
C23 1nF
Q9 BC327
Q12 2N3906
R71 330R
R90 1k8
R91 100R
+10V BIAS
C58 100nF
D11 10V
Q13 2N3904
C42 1pF
R92 220R
R72 68R
R99 100R
R100 3M3
R119 200k
OFFSET NULL
R73 5k6
C33 4p7F
R96 2k7
C31 15pF
C32 15pF
D12 HSCH1001
TP7
R74 5k5 ·01%
D13 HSCH1001
C34 4p7F
R95 2k7
TP9
R76 4k99 1%
R94 10k0 1%
R28 1R5
TO M11 PIN 10 SHT. 3
H.F. FLAG
J1-1
TP6
C41 680pF 1%
C57 680pF 1%
M19 FX-301L
R113 105k 1%
R112 105k 1%
R114 100k
H.F. FLAG (>20kHz)
C56 100nF
D10 HSCH1001
C40 1n8F
C39 1n8F
M18 FX-301L
R109 4k7
Q22 BC184
FROM M1 PIN 6 SHT. 4
F3
R110 100k
R111 22k
R108 392k 1%
R107 392k 1%
Q20 U1994
C55 100nF
R127 6k8
M.F. FLAG (>2kHz)
LOG AMPLIFIER
R75 4k8925 ·01%
DC-DC TURNOVER
R62 10R
R63 10R
R97 10k000 ·01%
M14 µA714HC
D9 12V
Q14 TCR510
Q16 U1899
R79 7k5
C57 100nF
R78 1k8
R80 470R
Q15 BC327
Q6 2N3906
R38 270R
C18 120pF
R37 270R
Q5 2N3904
R35 220R
R36 68R
R77 100M
R101 1M
LINEARITY
C35 2p2F
TP10
R25 1k2
C26 100pF
R31 330R
D5 1N4148
VIRTUAL EARTH
To M11 PIN 9 SHT. 3
LOG VOLTAGE
To M11 PINS 4, 12 + 15 SHT. 3

FREQUENCY	F3	H.F. FLAG
< 2kHz	0	0
≥ 2kHz, < 20kHz	0	1
≥ 20kHz	0	1
< 2kHz	1	0
≥ 2kHz, < 20kHz	1	0
≥ 20kHz	1	1

F3. 0 = -15V
1 = 0V

ISS.	CHANGES
1	RELEASED. 12.4.83
2	ECO 1485 C43 WAS 10pF C92 ADDED. BJ. JR 18 5 83

AC RECT, + LOG CONV.

DRAWN	DATE	DIMENSIONS IN MILLIMETRES	TOLERANCES	MATERIAL	ASSY DRG & PARTS LIST	400504	TITLE
IL	21. 1. 83		DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm ANGULAR ± ½°		CIRCUIT DIAGRAM		1081 AC.
CHECKED L.O.G	DATE 11.2.83	SCALE		FINISH	CHECK PROCEDURE	460504	
APPR. R.W.F.	DATE 12-4-83	NOT TO BE SCALED	UNLESS OTHERWISE STATED FIRST ANGLE PROJECTION		CHECK LIST	470504	

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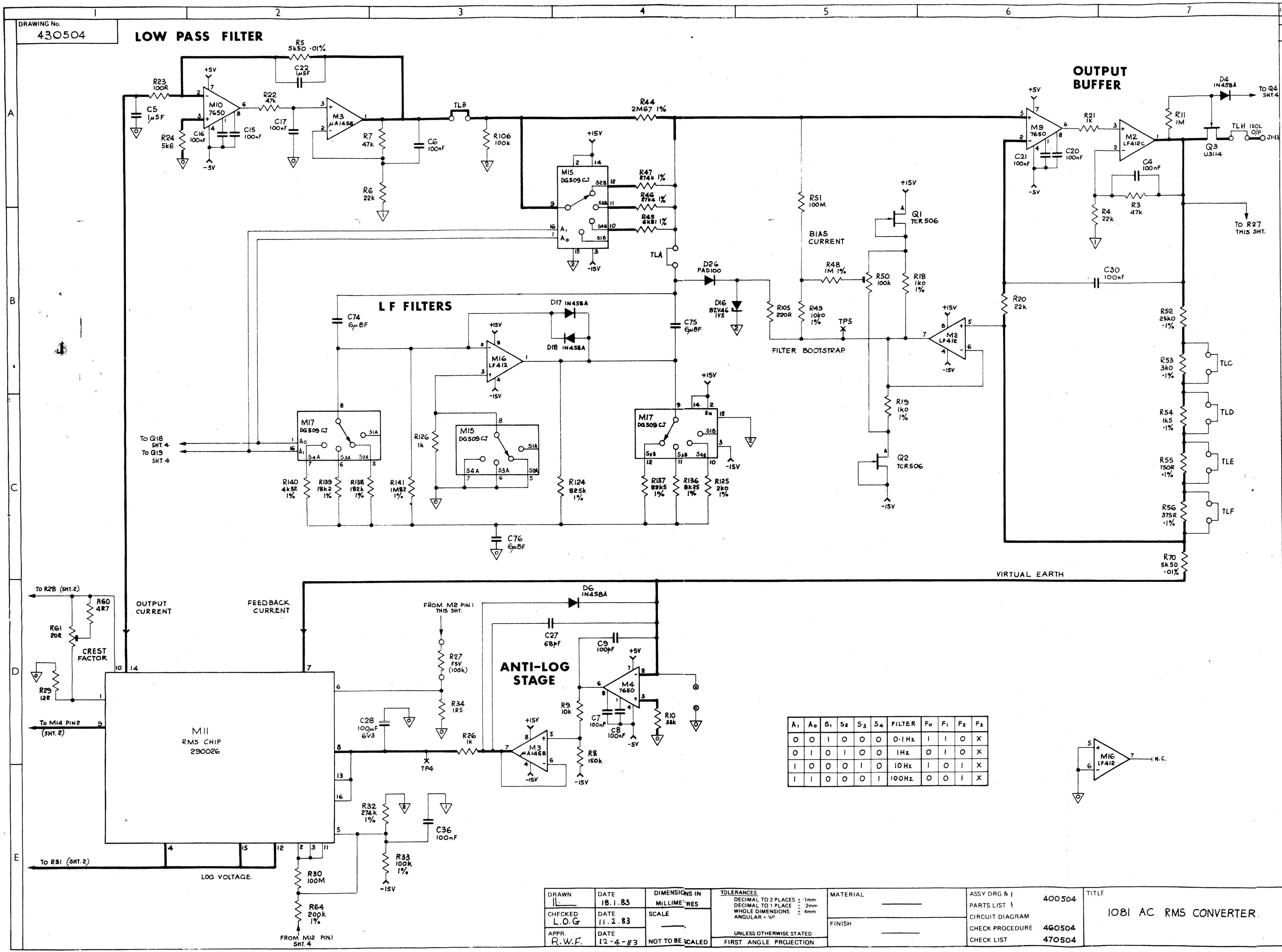
DRAWING No. 430504

SHEET 2 OF 4

DRAWING No.
430504


LOW PASS FILTER
R5 5k50 ·01%
C22 1µF
R23 100R
+5V
M10 7650
R22 47k
M3 µA1458
C5 1µF
R24 5k6
C16 100nF
C15 100nF
C17 100nF
-5V
R7 47k
C6 100nF
R6 22k
TLB
R106 100k
R44 2M67 1%
+15V
M15 DG509CJ
R47 274k 1%
R46 27k4 1%
R45 6k81 1%
-15V
TLA
D26 PAD100
D16 BZV46 1V5
R105 220R
R51 100M
BIAS CURRENT
R48 1M 1%
R49 10k0 1%
R50 100k
R18 1k0 1%
TP5
FILTER BOOTSTRAP
Q1 TCR506
Q2 TCR506
R19 1k0 1%
M2 LF412
L F FILTERS
C74 6µ8F
D17 IN458A
D18 IN458A
M16 LF412
C75 6µ8F
To Q18 SHT.4
To Q19 SHT.4
M17 DG509CJ
R126 1k
R140 4k32 1%
R139 18k2 1%
R138 182k 1%
R141 1M82 1%
R124 825k 1%
R137 82k5 1%
R136 8k25 1%
R125 2k0 1%
C76 6µ8F
OUTPUT BUFFER
M9 7650
R21 1k
M2 LF412C
C21 100nF
C20 100nF
C4 100nF
R4 22k
R3 47k
R11 1M
D4 IN458A
To Q4 SHT.4
TLH ISOL O/P
JH3
Q3 U3114
To R27 THIS SHT.
C30 100nF
R20 22k
R52 25k0 ·1%
R53 3k0 ·1%
TLC
R54 1k5 ·1%
TLD
R55 750R ·1%
TLE
R56 375R ·1%
TLF
R70 5k50 ·01%
VIRTUAL EARTH
To R28 (SHT.2)
R60 4R7
R61 20R
CREST FACTOR
R29 12R
OUTPUT CURRENT
FEEDBACK CURRENT
M11 RMS CHIP 290026
To M14 PIN2 (SHT.2)
To R31 (SHT.2)
LOG VOLTAGE
FROM M2 PIN1 THIS SHT.
R27 FSV (100k)
R34 1R5
D6 IN458A
C27 68pF
C9 100pF
ANTI-LOG STAGE
M4 7650
R9 10k
C7 100nF
C8 100nF
R10 33k
C28 100µF 6V3
TP4
R26 1k
M3 µA1458
R8 150k
R32 274k 1%
C36 100nF
R33 100k 1%
R30 100M
R64 200k 1%
FROM M12 PIN1 SHT.4
M16 LF412
N.C.

A₁	A₀	S₁	S₂	S₃	S₄	FILTER	F₀	F₁	F₂	F₃
0	0	1	0	0	0	0·1Hz	1	1	0	X
0	1	0	1	0	0	1Hz	0	1	0	X
1	0	0	0	1	0	10Hz	1	0	1	X
1	1	0	0	0	1	100Hz	0	0	1	X

ISS.	CHANGES
1	RELEASED. 12.4.83
2	ECO 1485 SEE SHEET2 BJ

TRMS CONV

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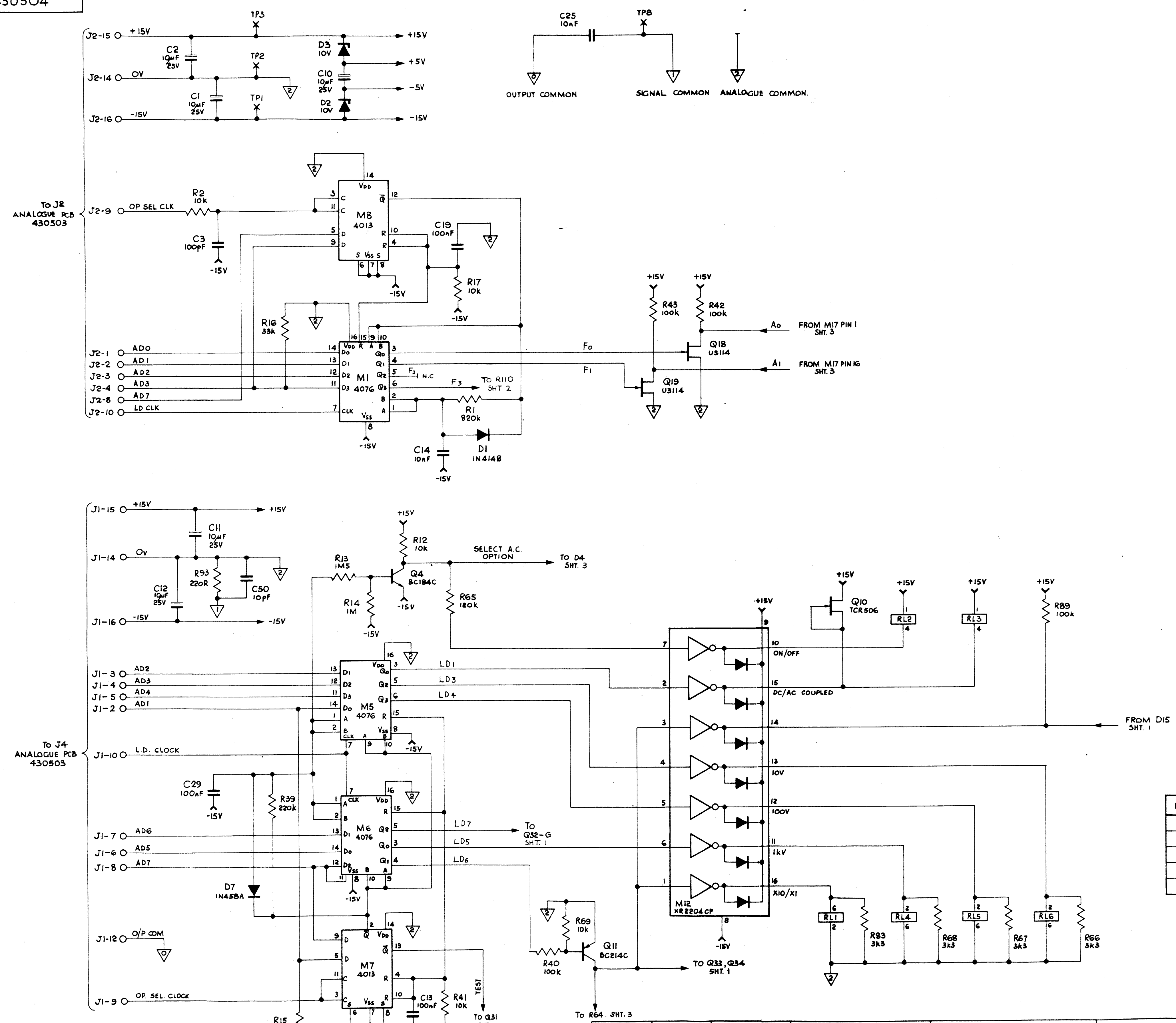
ELECTRONICS
LIMITED
NORWICH

DRAWN IL	DATE 18.1.83	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm ANGULAR ± ½° UNLESS OTHERWISE STATED	MATERIAL	ASSY DRG & PARTS LIST 400504	TITLE 1081 AC RMS CONVERTER.
CHECKED L.O.G	DATE 11.2.83	SCALE		FINISH	CIRCUIT DIAGRAM	DRAWING No. 430504
APPR. R.W.F.	DATE 12-4-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION		CHECK PROCEDURE 460504 CHECK LIST 470504	SHEET 3 OF 4

4951MT

DRAWING No.
430504

ISS.	CHANGES
1	RELEASED. 12.4.83
2	ECO 1485 SEE SHEET 2



1
2
3
4
5
6
7
A
B
C
D
E
J2-15 +15V
J2-14 0V
J2-16 -15V
C2 10µF 25V
C1 10µF 25V
TP3
TP2
TP1
D3 10V
C10 10µF 25V
D2 10V
+15V
+5V
-5V
-15V
C25 10nF
TP8
OUTPUT COMMON
SIGNAL COMMON
ANALOGUE COMMON.
To J2 ANALOGUE PCB 430503
J2-9 OP SEL CLK
R2 10k
C3 100pF
M8 4013
C19 100nF
R17 10k
R16 33k
M1 4076
J2-1 AD0
J2-2 AD1
J2-3 AD2
J2-4 AD3
J2-8 AD7
J2-10 LD CLK
F0
F1
F2 N.C
F3
To R110 SHT 2
R1 820k
D1 1N4148
C14 10nF
R43 100k
R42 100k
Q18 U3114
Q19 U3114
A0 FROM M17 PIN 1 SHT. 3
A1 FROM M17 PIN 16 SHT. 3
J1-15 +15V
J1-14 0v
J1-16 -15V
C11 10µF 25V
C12 10µF 25V
R93 220R
C50 10pF
R12 10k
R13 1M5
R14 1M
Q4 BC184C
SELECT A.C. OPTION
To D4 SHT. 3
R65 120k
To J4 ANALOGUE PCB 430503
J1-3 AD2
J1-4 AD3
J1-5 AD4
J1-2 AD1
J1-10 L.D. CLOCK
M5 4076
LD1
LD3
LD4
C29 100nF
R39 220k
M6 4076
J1-7 AD6
J1-6 AD5
J1-8 AD7
LD7
To Q32-G SHT. 1
LD5
LD6
D7 1N458A
J1-12 O/P COM
M7 4013
C13 100nF
R41 10k
TEST
To Q31 SHT. 1
J1-9 OP. SEL. CLOCK
R15 33k
R69 10k
R40 100k
Q11 BC214C
TO Q33, Q34 SHT. 1
To R64. SHT. 3
Q10 TCR506
RL2
RL3
R89 100k
M12 XR2204CP
ON/OFF
DC/AC COUPLED
10V
100V
1kV
X10/X1
FROM D15 SHT. 1
RL1
RL4
RL5
RL6
R83 3k3
R68 3k3
R67 3k3
R66 3k3

RANGE	LD1	LD3	LD4	LD5	LD6	LD7
0·1V	X	0	0	0	1	0
1V	X	0	0	0	0	0
10V	X	1	0	0	0	1
100V	X	0	1	0	0	1
1000V	X	0	0	1	0	1

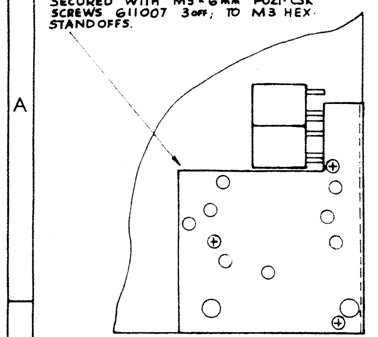
AC RANGING

datron
ELECTRONICS
LIMITED
NORWICH

DRAWN IL	DATE 21. 1. 83	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm ANGULAR ± ½°	MATERIAL	ASSY DRG & PARTS LIST 400504	TITLE 1081 AC RANGING
CHECKED L.O.G	DATE 11.2.83	SCALE	UNLESS OTHERWISE STATED	FINISH	CIRCUIT DIAGRAM	DRAWING No. 430504
APPR. R.W.F.	DATE 12-4-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION		CHECK PROCEDURE 460504 CHECK LIST 470504	SHEET 4 OF 4

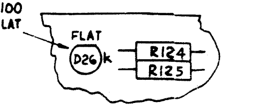
DRAWING No.
400504

GUARD SHIELD 450388 TO BE SECURED WITH M3×6mm POZI-CSK SCREWS 611007 3off; TO M3 HEX-STANDOFFS.



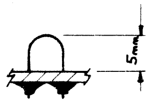
	MOUNTING I.Cs		
Nº OF WAYS	PART Nº	Nº OFF	USED TO MOUNT
8	605059	4	M2. M3. M13. M16
14	605060	2	M7. M8.
16	605061	6	M1. 5. 6. 12. 15. 17

* N.B. WHEN FITTING SILICONIX DEVICE JPAD100 (PLASTIC PACKAGE WITH FLAT EDGE) FIT AS SHOWN.

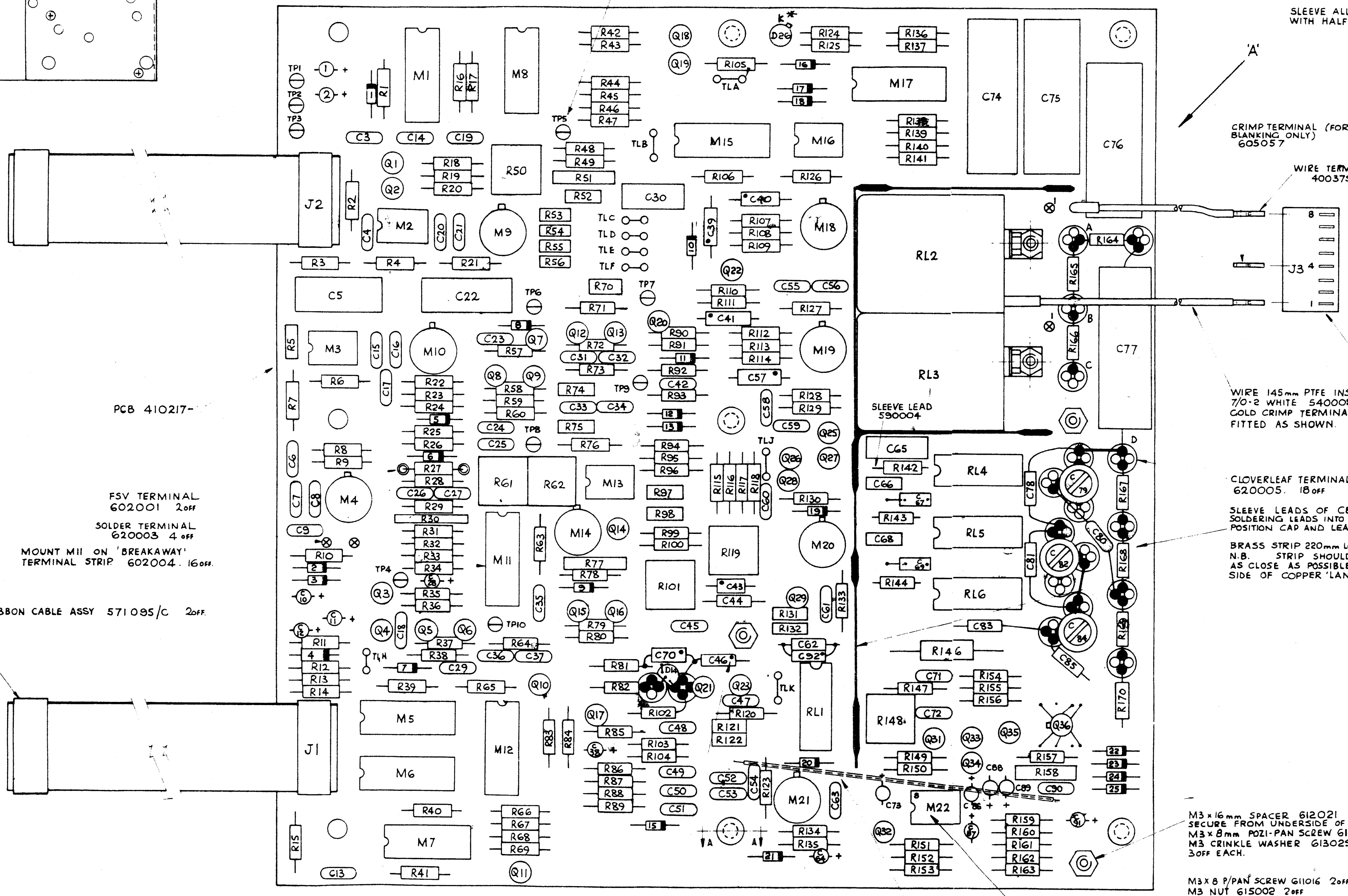


TEST POINT TERMINAL 620007 10off

TEST LINKS MADE FROM 22 SWG BTC WIRE 540002 A/R.



SLEEVE ALL SOLDERED JOINTS WITH HALF PIECE OF 590001



CRIMP TERMINAL (FOR BLANKING ONLY) 605057

WIRE TERMINAL ASSY 400379/5

8 WAY POLARISED SOCKET 605052

WIRE 145mm PTFE INSULATED 7/0·2 WHITE 540008; PLUS GOLD CRIMP TERMINAL 605057 FITTED AS SHOWN.

SLEEVE LEAD 590004

PCB 410217-

FSV TERMINAL 602001 2off

SOLDER TERMINAL 620003 4off

MOUNT M11 ON 'BREAKAWAY' TERMINAL STRIP 602004. 16off.

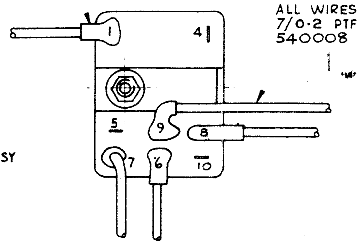
16 WAY RIBBON CABLE ASSY 571095/C 2off.

CLOVERLEAF TERMINAL 620005. 18off

SLEEVE LEADS OF C80 BEFORE SOLDERING LEADS INTO CLOVERLEAF - 590004
POSITION CAP AND LEADS AWAY FROM CLOVERLEAFS.

BRASS STRIP 220mm LONG 630107
N.B. STRIP SHOULD BE SOLDERED AS CLOSE AS POSSIBLE TO LEFT HAND SIDE OF COPPER 'LAND' AS SHOWN.

ALL WIRES TO RELAY PINS 7/0·2 PTFE INSULATED - WHITE 540008



VIEW SHOWING RELAY PIN Nºs.

RELAY WIRING		
FROM	TO	LENGTH (mm)
RL2 PIN 1	SOLDER PIN 1	25
RL2 PIN 6	RL2 PIN 9	25
RL2 PIN 7	J3 PIN 1	120
RL2 PIN 10	RL3 PIN 9	40
RL3 PIN 1	SOLDER PIN 2	25
RL3 PIN 7	C/LEAF B	45
RL3 PIN 6	C/LEAF D	35
RL3 PIN 10	C/LEAF C	25
RL3 PIN 8	C/LEAF A	55

AC PCB

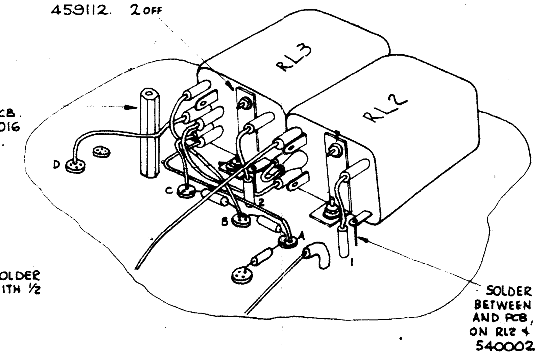
RELAY BRACKET 459112. 2off

3-48 UNC NUT 615005 2off
M2·5 WASHER 613014 2off

M3×16mm SPACER 612021
SECURE FROM UNDERSIDE OF PCB.
M3×8mm POZI-PAN SCREW 611016
M3 CRINKLE WASHER 613029.
3off EACH.

M3×8 P/PAN SCREW 611016 2off
M3 NUT 615002 2off
M3 SHAKEPROOF 2off

SOLDER WIRE ENDS TO SOLDER TERMINALS & SLEEVE WITH ½ PIECE OF 590001



SOLDER WIRE LINKS BETWEEN RELAY TERMS AND PCB, AS SHOWN ON RL2 & RL3 540002

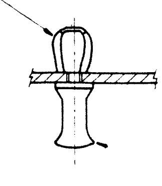
VIEW IN DIRECTION OF ARROW 'A'
SHOWING RELAY WIRING

N.B. C77 REMOVED FROM VIEW, FOR CLARITY.

CROP PIN 8 FROM M22 BEFORE FITTING INTO PCB

LINK MADE FROM 7/0·2 PTFE INSULATED WHITE WIRE 540008 × 70mm. FIT TO UNDERSIDE OF PCB.

NYLATCH GROMMET 617011 5off



NYLATCH PLUNGER 617010 5off
NB. FIT FROM COMPONENT SIDE OF PCB.

SECTION A-A

DOT DENOTES OUTER FOIL (RED) END OF POLYSTYRENE CAPACITORS i.e. C39, C40, C41, C43, C46, C57, C70 C92.

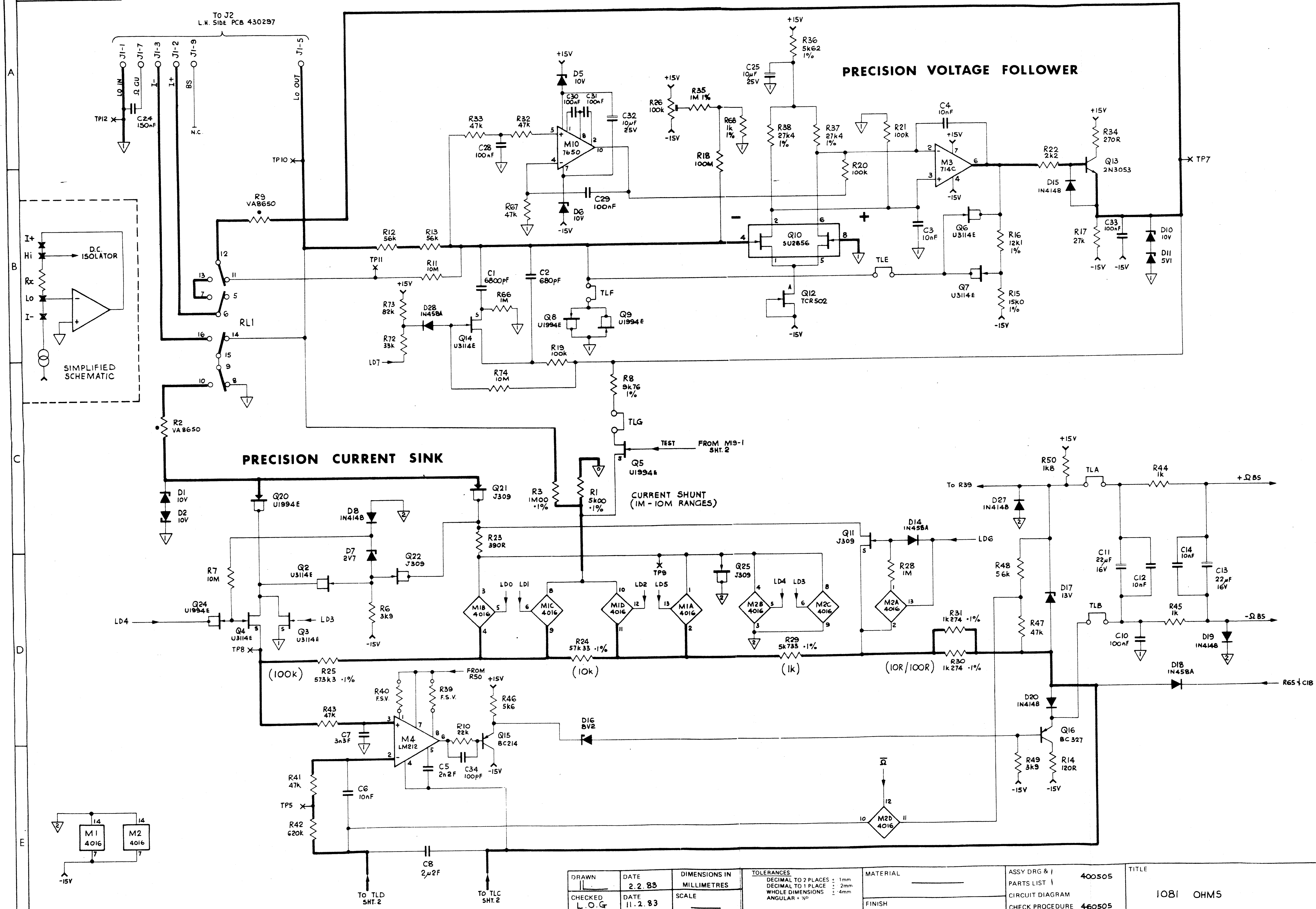
ISS.	CHANGES
1	RELEASED. 12.4.83
2	ECO 1485 C92 ADDED ALSO PARTS LIST CHANGE. B J. JR 18-5-83

DRAWN IL	DATE 21.12.82	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm ANGULAR ± ½° UNLESS OTHERWISE STATED	MATERIAL	ASSY DRG & PARTS LIST 400504 CIRCUIT DIAGRAM 430504 CHECK PROCEDURE 460504 CHECK LIST 470504	TITLE 1081 AC PCB ASSY	datron ELECTRONICS LIMITED NORWICH
CHECKED L.O.G.	DATE 14.2.83	SCALE 2:1		FINISH			DRAWING No. 400504
APPR R.W.F.	DATE 14-4-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION				SHEET 1 OF 19

4951MT

DRAWING No.
430505

ISS.	CHANGES
1	RELEASED 31.3.83
2	ECO 1484 C24 ADDED. JR 18-5-83 B


1
2
3
4
5
6
7
A
B
C
D
E
To J2
L.H. SIDE PCB 430297
J1-1
J1-7
J1-3
J1-2
J1-9
J1-5
Lo IN
Ω GU
I-
I+
BS
Lo OUT
N.C.
TP12
C24
150nF
TP10
PRECISION VOLTAGE FOLLOWER
+15V
D5
10V
C30
100nF
C31
100nF
C32
10μF
25V
R33
47k
R32
47k
C28
100nF
M10
7650
R67
47k
D6
10V
-15V
C29
100nF
R26
100k
R35
1M 1%
R68
1k
1%
R18
100M
C25
10μF
25V
R36
5k62
1%
R38
27k4
1%
R37
27k4
1%
R20
100k
R21
100k
C4
10nF
M3
714C
+15V
-15V
C3
10nF
Q10
SU2856
Q6
U3114E
R16
12k1
1%
R15
15k0
1%
Q7
U3114E
TLE
Q12
TCR502
R22
2k2
D15
1N4148
R34
270R
Q13
2N3053
TP7
R17
27k
C33
100nF
D10
10V
D11
5V1
R9
VA8650
R12
56k
R13
56k
TP11
R11
10M
C1
6800pF
C2
680pF
R66
1M
TLF
Q8
U1994E
Q9
U1994E
R73
82k
D28
1N458A
Q14
U3114E
R72
33k
LD7
R19
100k
R74
10M
R8
9k76
1%
TLG
TEST
FROM M19-1
SHT. 2
Q5
U1994E
RL1
I+
Hi
Rx
Lo
I-
D.C.
ISOLATOR
SIMPLIFIED
SCHEMATIC
R2
VA8650
PRECISION CURRENT SINK
D1
10V
D2
10V
Q20
U1994E
Q21
J309
R3
1M00
·1%
R1
5k00
·1%
CURRENT SHUNT
(1M - 10M RANGES)
D8
1N4148
D7
2V7
Q22
J309
R23
390R
R7
10M
Q2
U3114E
R6
3k9
Q24
U1994E
LD4
Q4
U3114E
Q3
U3114E
LD3
TP8
LD0
LD1
M1B
4016
M1C
4016
M1D
4016
LD2
LD5
TP9
M1A
4016
Q25
J309
LD4
LD3
M2B
4016
M2C
4016
Q11
J309
D14
1N458A
LD6
R28
1M
M2A
4016
R24
57k33 ·1%
R29
5k733 ·1%
R31
1k274 ·1%
R30
1k274 ·1%
(100k)
(10k)
(1k)
(10R/100R)
R25
573k3 ·1%
FROM
R50
R40
F.S.V.
R39
F.S.V.
+15V
R46
5k6
R43
47k
C7
3n3F
M4
LM212
R10
22k
Q15
BC214
C5
2n2F
C34
100pF
D16
8V2
R41
47k
TP5
R42
620k
C6
10nF
C8
2μ2F
To TLD
SHT. 2
To TLC
SHT. 2
Ω̄
M2D
4016
M1
4016
M2
4016
-15V
+15V
R50
1k8
TLA
R44
1k
+Ω BS
To R39
D27
1N4148
R48
56k
D17
13V
C11
22μF
16V
C12
10nF
C14
10nF
C13
22μF
16V
TLB
R45
1k
-Ω BS
R47
47k
C10
100nF
D19
1N4148
D18
1N458A
R65 & C18
D20
1N4148
Q16
BC327
R49
3k9
R14
120R

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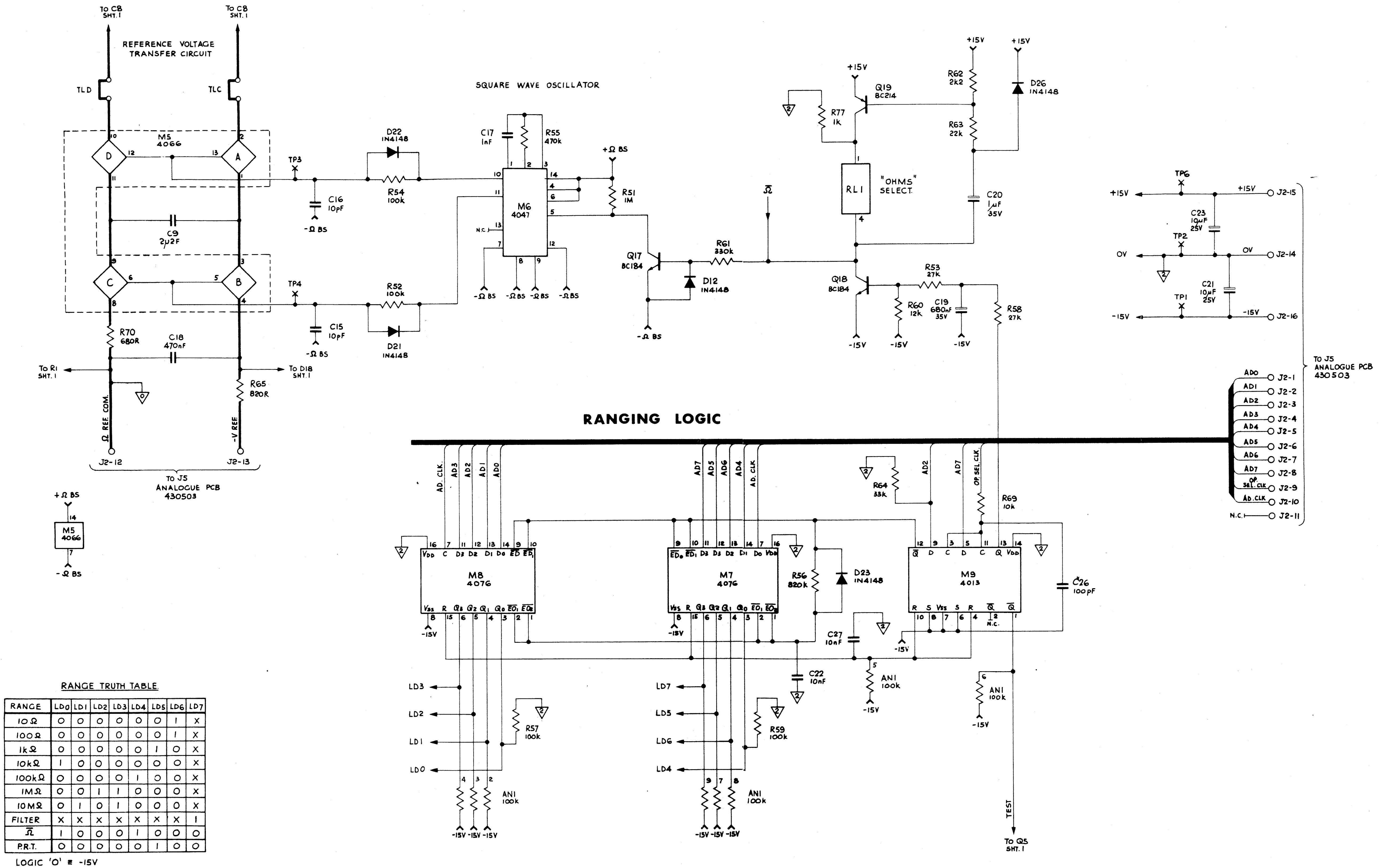
DRAWN	DATE	DIMENSIONS IN MILLIMETRES	TOLERANCES	MATERIAL	ASSY DRG & PARTS LIST	400505	TITLE	DRAWING No.
IL	2.2.83		DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm ANGULAR ± ½°		CIRCUIT DIAGRAM		1081 OHMS	430505
CHECKED	DATE	SCALE		FINISH	CHECK PROCEDURE	460505		
L.O.G	11.2.83		UNLESS OTHERWISE STATED		CHECK LIST	470505		SHEET 1 OF 2
APPR. RWF	DATE 31-3-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION					

OHMS CONV.

DRAWING No. 430505

ISS.	CHANGES
1	RELEASED 31.3.83
2	ECO 1484 SEE SHEET 1 JR 18-5-83



1
2
3
4
5
6
7
A
B
C
D
E
To C8 SHT. 1
To C8 SHT. 1
REFERENCE VOLTAGE TRANSFER CIRCUIT
TLD
TLC
M5 4066
D
A
C
B
C9 2μ2F
R70 680R
C18 470nF
R65 820R
To R1 SHT. 1
To D18 SHT. 1
Ω REF. COM.
-V REF.
J2-12
J2-13
To J5 ANALOGUE PCB 430503
+Ω BS
M5 4066
-Ω BS
SQUARE WAVE OSCILLATOR
TP3
TP4
C16 10pF
C15 10pF
-Ω BS
D22 1N4148
R54 100k
R52 100k
D21 1N4148
C17 1nF
R55 470k
M6 4047
N.C.
+Ω BS
R51 1M
Q17 BC184
D12 1N4148
R61 330k
Ω̄
+15V
Q19 BC214
R77 1k
RL1
"OHMS" SELECT
R62 2k2
R63 22k
D26 1N4148
C20 1μF 35V
Q18 BC184
R53 27k
R60 12k
C19 680nF 35V
R58 27k
-15V
TP6
+15V
C23 10μF 25V
TP2
0V
C21 10μF 25V
TP1
-15V
J2-15
J2-14
J2-16
To J5 ANALOGUE PCB 430503
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
OP SEL CLK
AD. CLK
N.C.
J2-1
J2-2
J2-3
J2-4
J2-5
J2-6
J2-7
J2-8
J2-9
J2-10
J2-11
RANGING LOGIC
AD. CLK.
AD3
AD2
AD1
AD0
AD7
AD5
AD6
AD4
AD. CLK.
AD2
AD7
OP. SEL CLK
R64 33k
R69 10k
M8 4076
M7 4076
M9 4013
R56 820k
D23 1N4148
C26 100pF
C27 10nF
C22 10nF
AN1 100k
LD3
LD2
LD1
LD0
LD7
LD5
LD6
LD4
R57 100k
R59 100k
AN1 100k
-15V -15V -15V
TEST
To Q5 SHT. 1

RANGE TRUTH TABLE.

RANGE	LD0	LD1	LD2	LD3	LD4	LD5	LD6	LD7
10Ω	0	0	0	0	0	0	1	X
100Ω	0	0	0	0	0	0	1	X
1kΩ	0	0	0	0	0	1	0	X
10kΩ	1	0	0	0	0	0	0	X
100kΩ	0	0	0	0	1	0	0	X
1MΩ	0	0	1	1	0	0	0	X
10MΩ	0	1	0	1	0	0	0	X
FILTER	X	X	X	X	X	X	X	1
$\overline{\Omega}$	1	0	0	0	1	0	0	0
P.R.T.	0	0	0	0	0	1	0	0

LOGIC '0' ≡ -15V
LOGIC '1' ≡ 0V
LOGIC 'X' ≡ 'DONT CARE' CONDITION

OHMS RANGING

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NORWICH

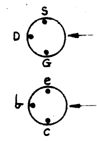
DRAWN IL	DATE 3.2.83	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm ANGULAR ± ½°	MATERIAL	ASSY DRG & PARTS LIST 400505	TITLE 1081 OHMS
CHECKED L.O.G.	DATE 11.2.83	SCALE	UNLESS OTHERWISE STATED	FINISH	CIRCUIT DIAGRAM	DRAWING No. 430505
APPR. RWF	DATE 31-3-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION		CHECK PROCEDURE 460505 CHECK LIST 470505	SHEET 2 OF 2

E.B.W.

4981MT

DRAWING No.
400505

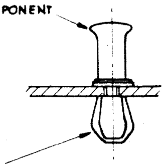
ISS.	CHANGES
1	RELEASED 31.3.83
2	ECO 1484.1500 C24 ADDED. R24. R25. R29 - R31 PART Nº ISSUES WERE 1. IL/JR 8.6.83



ALL SINGLE FET LEGS IN THE ORDER SHOWN

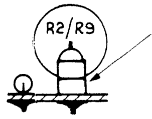
ALL TRANSISTOR LEGS IN THE ORDER SHOWN

NYLATCH PLUNGER 617010 4 OFF
N.B. FIT FROM COMPONENT SIDE OF PCB.

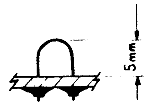


NYLATCH GROMMET 617011. 4 OFF

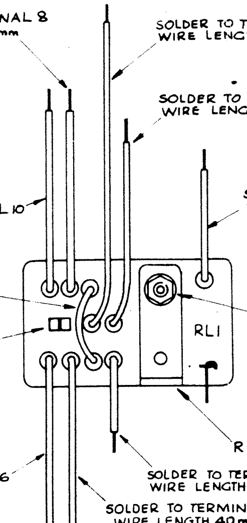
SECTION A-A.



MOUNT R2/R9 WITH 2 PORCELAIN BEADS 630024 ON EACH LEG AS SHOWN



TYPICAL TEST POINT/TEST LINK LOOP
MAKE FROM 22 B.T.C. WIRE 540002



SOLDER TO TERMINAL 8
WIRE LENGTH 40mm

SOLDER TO TERMINAL 6
WIRE LENGTH 60mm

SOLDER TO TERMINAL 12
WIRE LENGTH 30mm

SOLDER TO TERMINAL 1
WIRE LENGTH 25mm

SOLDER TO TERMINAL 10
WIRE LENGTH 35mm

JOIN PINS 7 & 13 WIRE
WIRE LENGTH 20mm

TAGS 9 & 15 SOLDERED TOGETHER & SLEEVED 1/2 PIECE OF 590001

WASHER M2.5 SHAKEPROOF 613014
NUT 3-48 UNC 615005.

PIN Nº 4 LINKED TO PCB USING 22 SWG BTC WIRE 540002 (TERMᴸ 4)

RELAY BRACKET 459112

SOLDER TO TERMINAL 16
WIRE LENGTH 35mm

SOLDER TO TERMINAL 11
WIRE LENGTH 20mm

SOLDER TO TERMINAL 14
WIRE LENGTH 40mm

FIT C 24 ON UNDERSIDE OF P.C.B BETWEEN J1-1 AND J1-7
BED IN SMALL QUANTITY OF SILICONE RUBBER 900004
SLEEVE LEADS WITH 590004 AND WRAP AROUND PINS.

FIT SOCKET FOR M6 IN REVERSE DIRECTION TO THE COMPONENT SHOWN
(ENSURE IC'S DO NOT TOUCH WHEN FITTED CORRECTLY)
IN SOCKETS

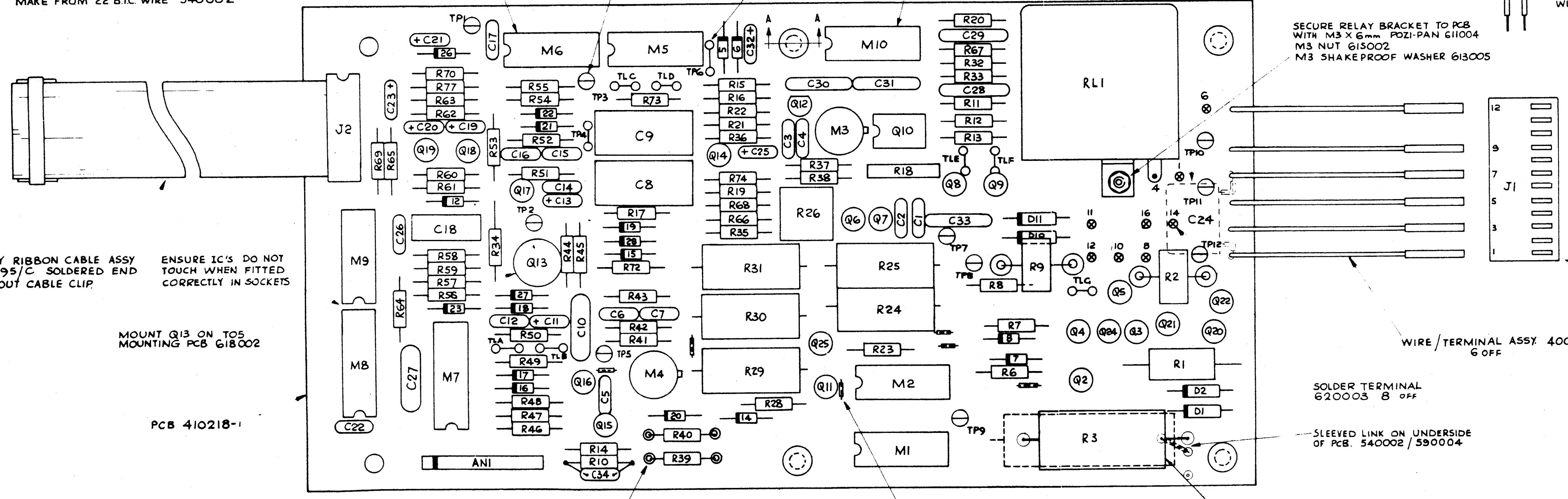
TEST POINT TERMINAL 620007 10 OFF

TP4/TP6 : MAKE LOOP FROM 22SWG BTC WIRE 540002

SOLDER M10 & Q10 DIRECT INTO PCB.

SECURE RELAY BRACKET TO PCB
WITH M3 X 6mm POZI-PAN 611004
M3 NUT 615002
M3 SHAKEPROOF WASHER 613005

ALL RELAY WIRES USE 7/.2 PTFE INSULATED WHITE WIRE 540008.
SLEEVE ALL JOINTS WITH 1/2 PIECE OF 590001.



TP1
C17
M6
M5
A
A
M10
R20
C29
R67
R32
R33
C28
R11
R12
R13
RL1
C21
26
R70
R77
R63
R62
C20
C19
C23
J2
R69
R65
Q19
Q18
R53
R55
R54
22
21
R52
TP3
TLC
TLD
R73
TP6
R15
R16
R22
R21
R36
C25
C30
C31
Q12
M3
Q10
C3
C4
C9
C8
Q14
TP4
R37
R38
R18
TLE
TLF
Q8
Q9
TP10
6
4
TP11
C24
TP12
C16
C15
R60
R61
12
R51
Q17
C14
C13
TP2
R17
19
28
15
R72
R74
R19
R68
R66
R35
R26
Q6
Q7
C2
C1
C33
D11
D10
11
16
14
12
10
8
TP7
TP8
R8
R9
TLG
Q5
R2
Q22
Q21
Q20
M9
C26
C18
R58
R59
R57
R56
23
27
18
C12
C11
R50
R34
Q13
R44
R45
C10
R43
C6
C7
R42
R41
R31
R30
R25
R24
R64
TLA
TLB
TP5
R23
Q25
R7
R6
Q4
Q24
Q3
R1
M8
C27
M7
R49
17
16
R48
R47
R46
Q16
C5
M4
R29
R28
Q11
M2
Q2
D2
D1
C22
20
R40
R39
14
Q15
R14
R10
C34
AN1
M1
TP9
R3
12
9
7
5
3
1
J1

16 WAY RIBBON CABLE ASSY 571095/C SOLDERED END WITHOUT CABLE CLIP.

ENSURE IC'S DO NOT TOUCH WHEN FITTED CORRECTLY IN SOCKETS

MOUNT Q13 ON TO5 MOUNTING PCB 618002

PCB 410218-1

12 WAY POLARISED SOCKET 605053

WIRE/TERMINAL ASSY. 400379/2
6 OFF

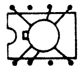
SOLDER TERMINAL 620003 8 OFF

SLEEVED LINK ON UNDERSIDE OF PCB. 540002/590004

R3 'MANN' COMPONENT (090107)

SLEEVED WIRE LINKS 540002/590004

F5V TERMINAL 602001 4 OFF



U404

ALTERNATIVE PIN-OUT FOR Q10

MOUNTING IC'S.			
Nº OF WAYS	PART Nº	Nº OFF	USED TO MOUNT
14	605060	5	M1, M2, M5, M6, M9
16	605061	2	M7, M8

OHMS PCB

DRAWN IL	DATE 9.12.82	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm ANGULAR + ½° UNLESS OTHERWISE STATED	MATERIAL ——	ASSY DRG & PARTS LIST 400505	TITLE 1081 OHMS PCB ASSY
CHECKED DG	DATE 9-2-83	SCALE 2:1		FINISH ——	CIRCUIT DIAGRAM 430505 CHECK PROCEDURE 460505	
APPR. RWF	DATE 31-3-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION		CHECK LIST 470505	

datron
ELECTRONICS
LIMITED
NORWICH

DRAWING No.
400505

SHEET 1 OF 12

1	2	3	4	5	6	7	ISS.	CHANGES
							1	RELEASED 31.3.83

DRAWING No. 430506

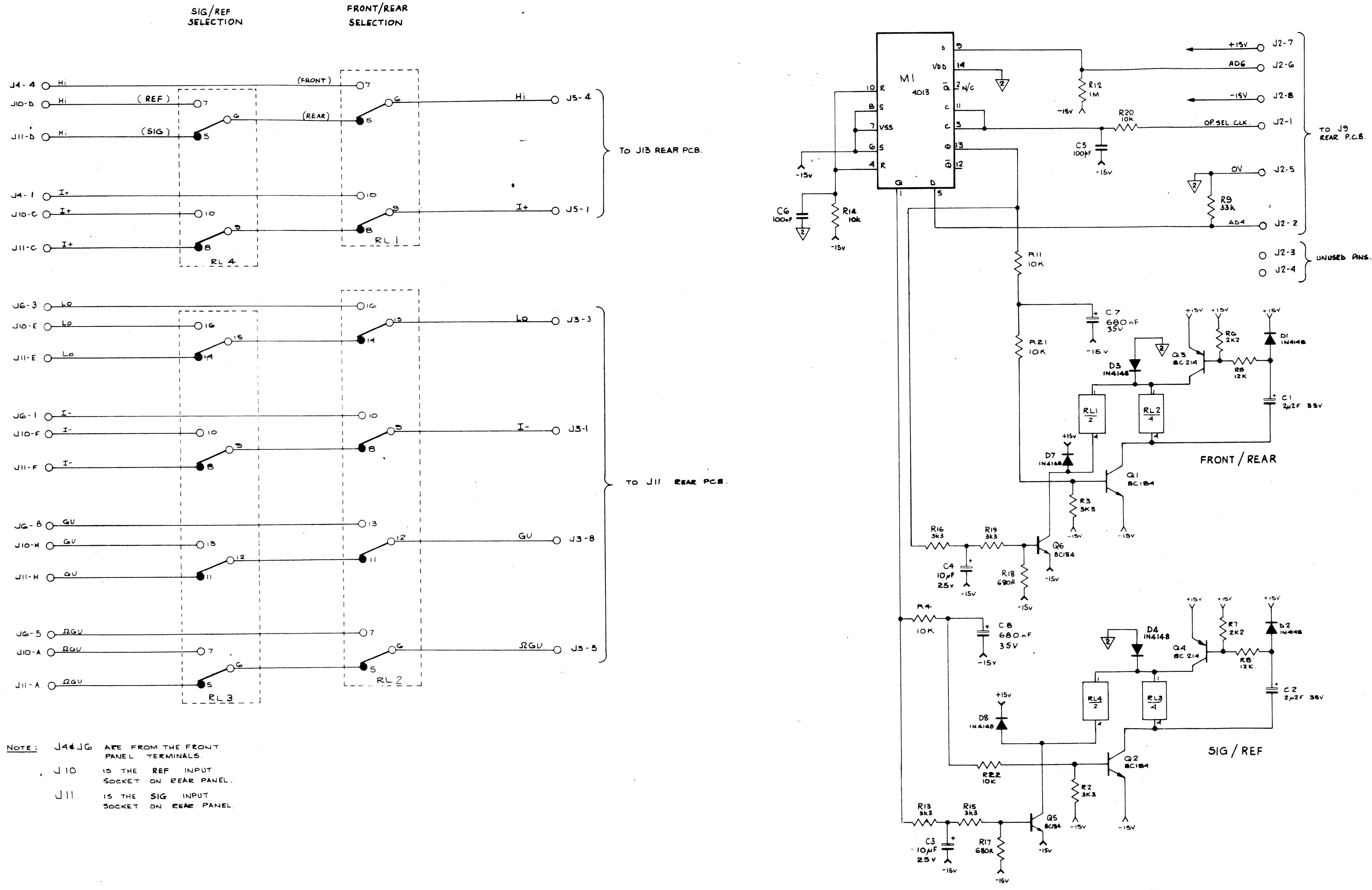
FIRST USED ON 1081

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES



SIG/REF SELECTION
FRONT/REAR SELECTION
J4-4
J10-D
J11-D
Hi
(REF)
(SIG)
(FRONT)
(REAR)
J5-4
TO J13 REAR PCB.
J4-1
J10-C
J11-C
I+
J5-1
RL 4
RL 1
J6-3
J10-E
J11-E
Lo
J3-3
J6-1
J10-F
J11-F
I-
J3-1
TO J11 REAR PCB.
J6-8
J10-H
J11-H
GU
J3-8
J6-5
J10-A
J11-A
ΩGU
J3-5
RL 3
RL 2
M1
4013
VDD
VSS
N/C
D
Q
R
S
C
R12
1M
R20
10k
C5
100pF
-15V
+15V
AD6
OP.SEL.CLK.
0V
R9
33k
AD4
J2-7
J2-6
J2-8
J2-1
J2-5
J2-2
TO J9 REAR P.C.B.
J2-3
J2-4
UNUSED PINS.
C6
100nF
R14
10k
R11
10K
C7
680nF
35V
R21
10K
R6
2K2
D1
1N4148
D3
1N4148
Q3
BC214
R8
12K
C1
2μF 35V
RL1
RL2
D7
1N4148
Q1
BC184
R3
3K3
FRONT / REAR
R16
3k3
R19
3k3
Q6
BC184
C4
10μF
25V
R18
680R
R4
10K
C8
680nF
35V
D4
1N4148
Q4
BC214
R7
2K2
D2
1N4148
R5
12K
C2
2μF 35V
RL4
RL3
D8
1N4148
R22
10K
Q2
BC184
R2
3K3
SIG / REF
R13
3k3
R15
3k3
Q5
BC184
C3
10μF
25V
R17
680R

NOTE: J4&J6 ARE FROM THE FRONT PANEL TERMINALS.

J10 IS THE REF INPUT SOCKET ON REAR PANEL.

J11 IS THE SIG INPUT SOCKET ON REAR PANEL.

DRAWN	CHECKED	DIMENSIONS IN
IL	L.O.G.	MILLIMETRES
TRACED	APPROVED	SCALE
	R.W.F.	
DATE	DATE	
10.2.83		NOT TO BE SCALED

TOLERANCES ANGULAR ± ,°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± ·005
DECIMAL TO 2 PLACES ± ·010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED

MATERIAL ———

FINISH ———

datron ELECTRONICS LTD. NORWICH.

TITLE REAR INPUT / RATIO CIRCUIT. 1081

DRAWING No. 430506

DRAWING SIZE A1

SHEET 1 OF 1

REAR INPUT / RATIO

1	2	3	4	5	6	7

ISS.	CHANGES
B	
1	RELEASED 31.3.83

DRAWING No.
400506
FIRST USED ON

THIRD ANGLE PROJECTION

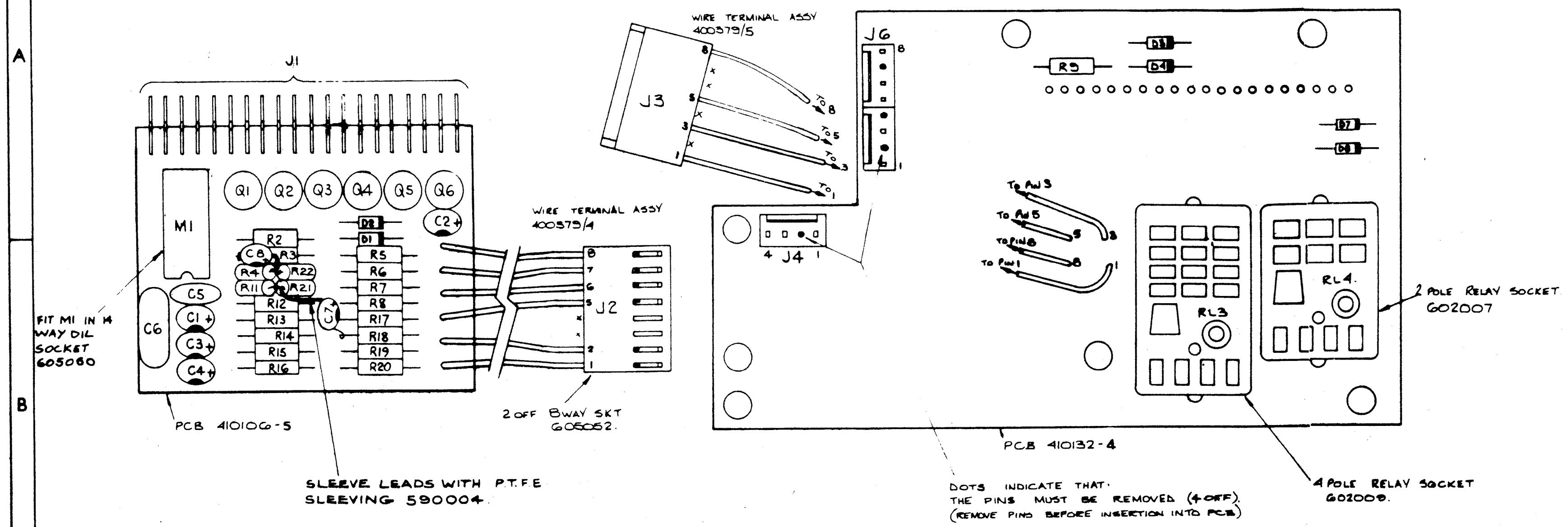
DRAWN IN ACCORDANCE WITH BS 308

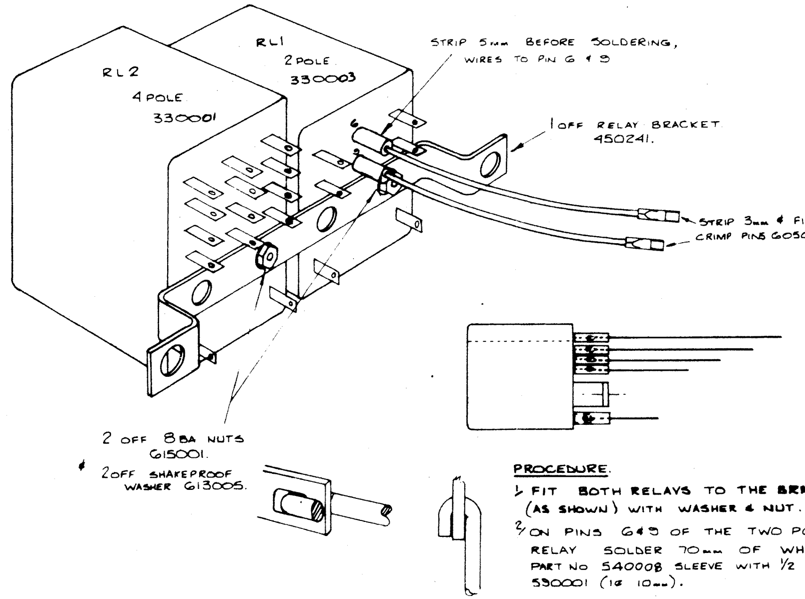
ALL BURRS TO BE REMOVED

NOTES

IMPORTANT.
FOR CRIMP PINS USE TOOL Nº HTR2262A.

REAR INPUT + RATIO PCBS


J1
Q1
Q2
Q3
Q4
Q5
Q6
M1
C2+
R2
C8
R3
R4
R22
R11
R21
C5
C6
C1+
C3+
C4+
R12
R13
R14
R15
R16
C7
D2
D1
R5
R6
R7
R8
R17
R18
R19
R20
FIT M1 IN 14 WAY DIL SOCKET 605060
PCB 410106-5
SLEEVE LEADS WITH P.T.F.E SLEEVING 590004.
WIRE TERMINAL ASSY 400379/4
J2
2 OFF 8WAY SKT 605052.
WIRE TERMINAL ASSY 400379/5
J3
TO 8
TO 5
TO 3
TO 1
J6
J4
R9
D3
D4
D7
D8
TO PIN 3
TO PIN 5
TO PIN 8
TO PIN 1
RL3
RL4.
2 POLE RELAY SOCKET 602007
PCB 410132-4
DOTS INDICATE THAT. THE PINS MUST BE REMOVED (4 OFF). (REMOVE PINS BEFORE INSERTION INTO PCB)
4 POLE RELAY SOCKET 602008.


RL2
4 POLE
330001
RL1
2 POLE
330003
STRIP 5mm BEFORE SOLDERING, WIRES TO PIN 6 & 9
1 OFF RELAY BRACKET 450241.
STRIP 3mm & FIT CRIMP PINS 605057.
2 OFF 8BA NUTS 615001.
& 2 OFF SHAKEPROOF WASHER 613005.

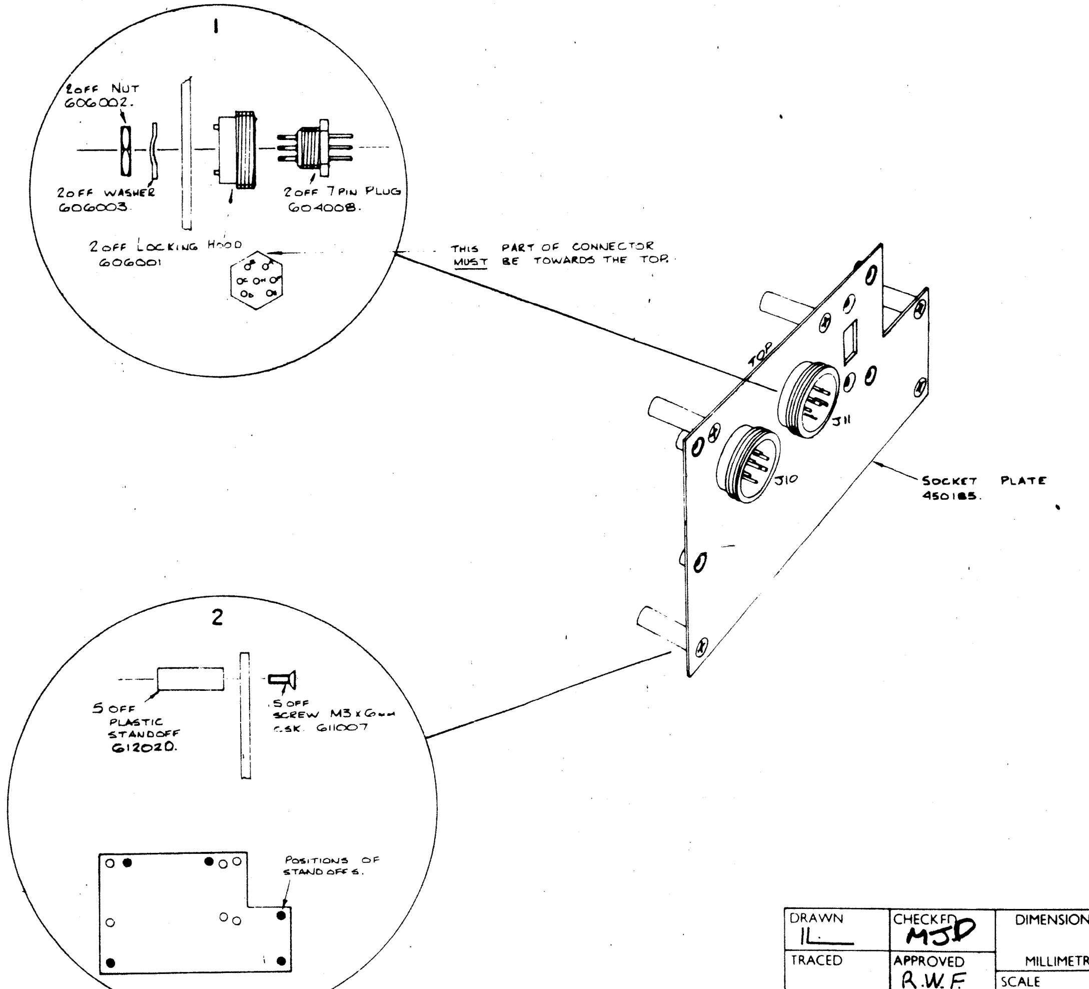
PROCEDURE.

1/ FIT BOTH RELAYS TO THE BRACKET (AS SHOWN) WITH WASHER & NUT.

2/ ON PINS 6 & 9 OF THE TWO POLE RELAY SOLDER 70mm OF WHITE WIRE PART No 540008 SLEEVE WITH ½ PIECE OF 590001 (1 @ 10mm).

3/ ALL OTHER CONTACTS ARE TO HAVE APPROXIMATELY 60mm OF 22 SWG TINNED COPPER WIRE PART Nº 540002 & SLEEVE EACH WITH ½ PIECE OF 590001.

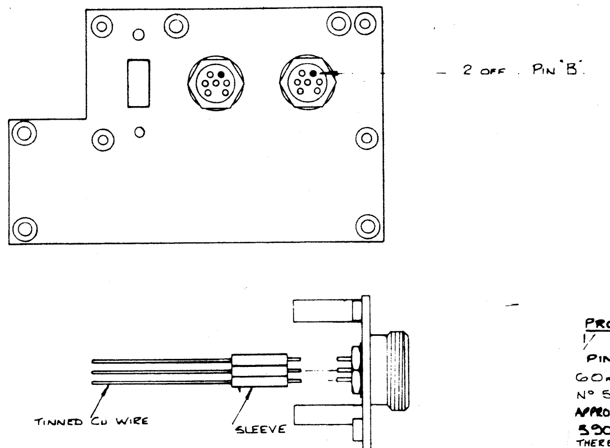
4/ STAGGER LENGTHS OF TINNED COPPER WIRE, TO ASSIST FITTING TO PCB, AS SHOWN.


1
2 OFF NUT 606002.
2 OFF WASHER 606003.
2 OFF 7 PIN PLUG 604008.
2 OFF LOCKING HOOD 606001
THIS PART OF CONNECTOR MUST BE TOWARDS THE TOP.
TOP
J11
J10
SOCKET PLATE 450185.
2
5 OFF PLASTIC STANDOFF 612020.
5 OFF SCREW M3 x 6mm CSK 611007
POSITIONS OF STAND OFFS.

PROCEDURE.

1/ ASSEMBLE THE 7 PIN PYE PLUGS. FIRST & ENSURE THAT THE CONNECTORS ARE SECURED IN THE POSITION SHOWN.

2/ ASSEMBLE THE 5 STANDOFF'S IN THE POSITION SHOWN BY THE LARGE DOTS.


2 OFF . PIN 'B'.
TINNED CU WIRE
SLEEVE

PROCEDURE

1/ ALL PINS ON EACH SOCKET EXCEPT PIN B (SHOWN SOLID), SOLDER ON 60mm OF TINNED COPPER WIRE PART Nº 540002 & SLEEVE ALL JOINTS WITH APPROXIMATELY 16mm OF SLEEVING PART No 590001.
THERE SHOULD NOW BE 12 WIRES.

DRAWN IL	CHECKED MJD	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED ANGULAR ± °	MATERIAL
TRACED	APPROVED R.W.F.	SCALE		FINISH
DATE 10.2.83	DATE 18.2.83	NOT TO BE SCALED		

datron ELECTRONICS LTD. NORWICH.

TITLE
REAR INPUT / RATIO ASSY 1081.

DRAWING SIZE
A1

DRAWING No.
400506

SHEET
1 OF 8

JW 116

DRAWING No.
400506
FIRST USED ON

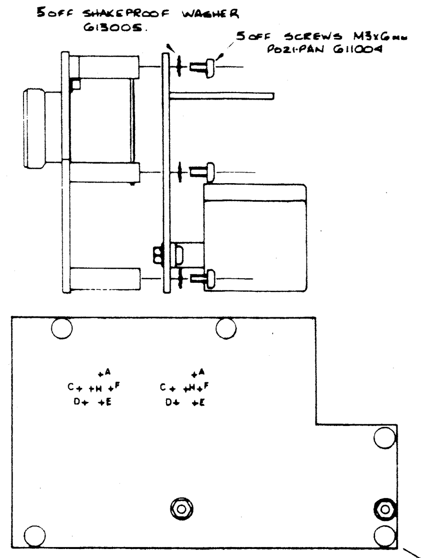
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
B	
1	RELEASED 31.3.83


5 OFF SHAKEPROOF WASHER G13005.
5 OFF SCREWS M3x6mm POZI-PAN G11004
+A
C+ +H +F
D+ +E
+A
C+ +H +F
D+ +E

3/ BOTTOM VIEW SHOWS THE HOLES IN THE P.C.B (INDICATED BY CROSSES). THESE HOLES ARE FOR THE WIRES FROM THE TWO 7 PIN SOCKETS
IT IS A SUGGESTION THAT THE WIRES ARE STAGGERED TO MAKE ASSY EASIER (AS WIRING THE RELAYS).

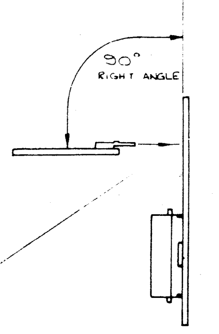
PROCEDURE.

① THE WIRES SHOULD LINE UP WITH THE APPROPRIATE HOLES. IE. WIRE FROM PIN A OF SOCKET SHOULD BE INSERTED INTO HOLE 'A', WIRE FROM PIN 'C' TO HOLE 'C' AND SO ON.

② WHEN THE WIRES ARE INSERTED IN THE APPROPRIATE HOLES. SECURE THE 2 ASSY'S TOGETHER WITH THE M3X6mm POZI-PAN SCREWS & SHAKEPROOF WASHERS, SCREWED IN THE 5 STANDOFFS. (AS DETAILED)

③ LIGHTLY PULL ON THE TIN COPPER WIRES SO THE WIRE IS TAUT, THEN SOLDER & CROP IN THE USUAL MANNER.

2. INSERT CONNECTORS AS SHOWN.
SOLDER ALL 20 AMP PINS & CROP LEGS IN USUAL MANNER.
THE BOARD IS TO BE AT 90° WHEN SOLDERED IN.


90°
RIGHT ANGLE

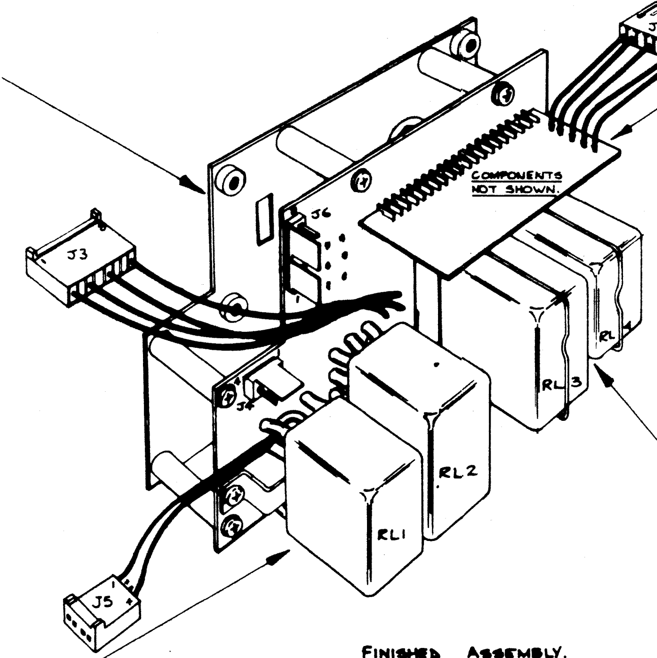
1/ SKETCH BELOW SHOWS THE 2 RELAY & BRACKET ASSEMBLY (FROM SHEET 1). THE CROSSES INDICATE HOLES IN THE P.C.B INTO WHICH THE WIRES FROM THE RELAYS ARE INSERTED.

PROCEDURE

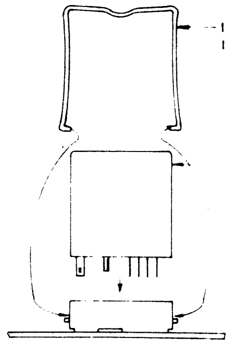
① INSERT THE WIRES INTO THE APPROPRIATE HOLES IN THE PCB (WIRE'S CUT AT DIFFERENT LENGTHS TO AID ASSEMBLY).

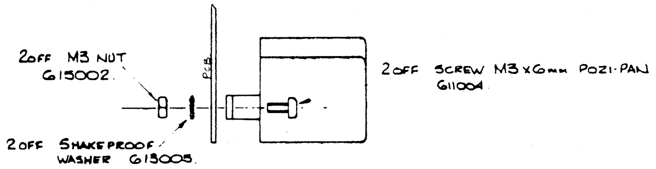
② WHEN THE WIRES ARE ALL IN PLACE SECURE THE BRACKET TO THE PCB USING THE SCREWS, WASHERS & NUTS SHOWN BELOW.

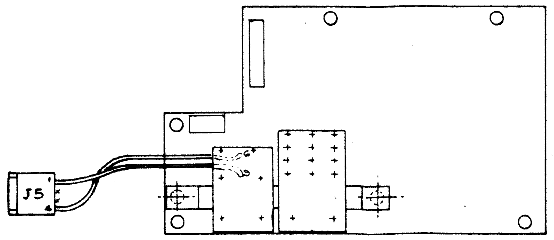
③ SOLDER & CROP WIRES IN THE USUAL MANNER. INSERT THE CRIMP PINS INTO SOCKET J5 PIN 6 OF RELAY TO PIN 4 OF J5 & PIN 9 TO PIN 1 AS SHOWN BELOW.


J2
J6
COMPONENTS NOT SHOWN.
J3
RL3
RL
J4
RL2
RL1
J5

FINISHED ASSEMBLY.


1 OFF CLIP G30005. (2 POLE)
1 OFF CLIP G30028. (4 POLE)
1 OFF 2 POLE RELAY 330003.
1 OFF 4 POLE RELAY 330001


2 OFF M3 NUT G15002.
P.C.B
2 OFF SCREW M3x6mm POZI-PAN G11004
2 OFF SHAKEPROOF WASHER G13005.

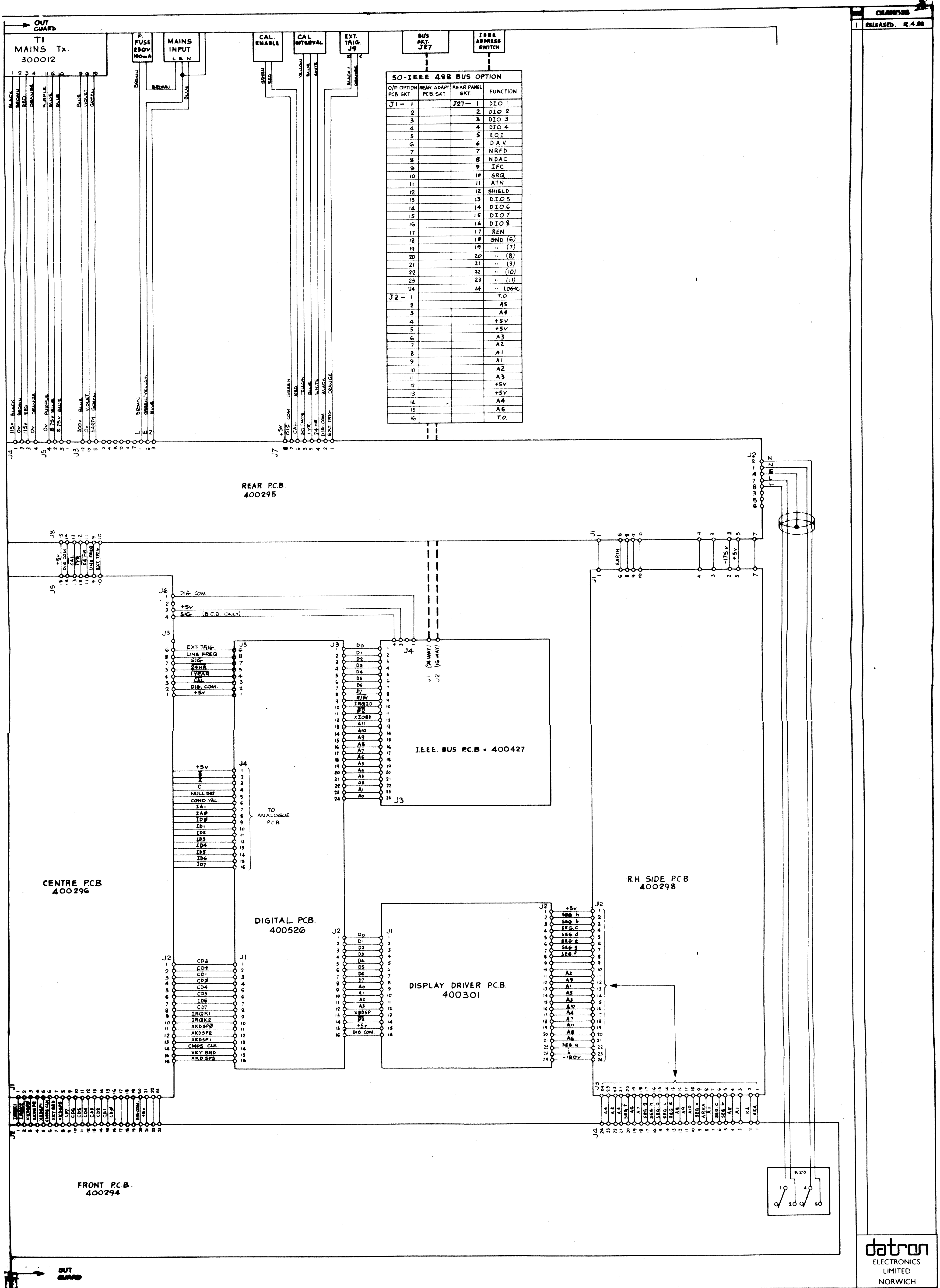


4/ THE LAST PROCEDURE IS TO PLUG IN THE 4 & 2 POLE RELAYS & HOLD IN PLACE BY THE CLIPS PROVIDED AS DETAILED IN ABOVE SKETCH & FINISHED VIEW.

REAR INPUT/RATIO RELAYS

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL	datron ELECTRONICS LTD. NORWICH.		DRAWING SIZE
IL	MSD	MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 ANGULAR ±½°	—			A1
TRACED	APPROVED R.W.F.	SCALE	METRIC DIMENSIONS DECIMAL TO 2 PLACES ± .1mm DECIMAL TO 1 PLACE ± .2mm WHOLE DIMENSIONS ± .4mm	FINISH	TITLE	DRAWING No.	SHEET
DATE 10.2.83	DATE 18.3.83	NOT TO BE SCALED	UNLESS OTHERWISE STATED	—	REAR INPUT / RATIO ASSY. 1081	400506	2 OF 8

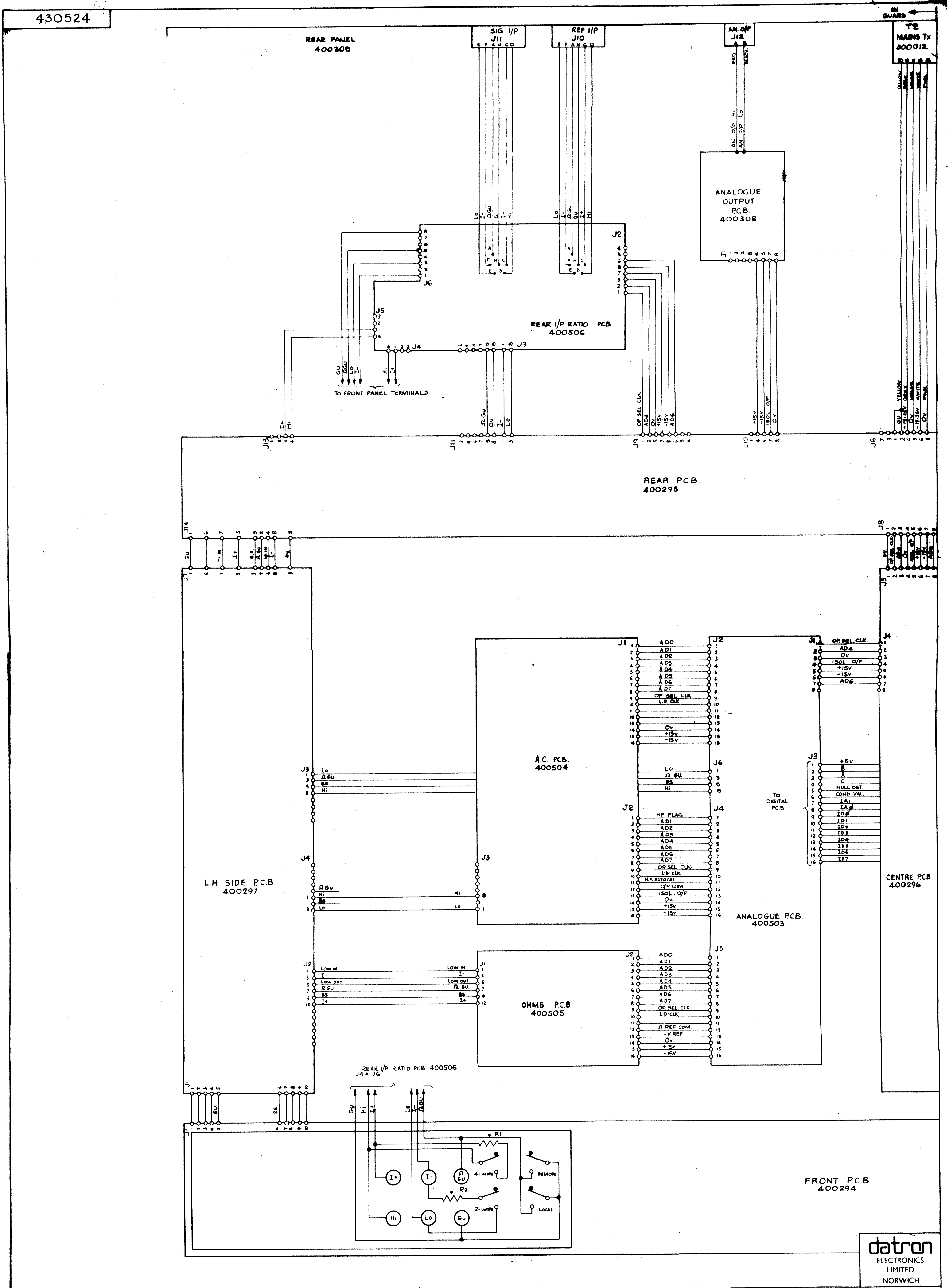
INTERCONNECTIONS 1


CHANGES
1 RELEASED. 12.4.83
OUT GUARD
T1 MAINS Tx. 300012
F1 FUSE 250V 160mA
MAINS INPUT
L E N
CAL. ENABLE
CAL INTERVAL
EXT. TRIG. J9
BUS SKT. J27
IEEE ADDRESS SWITCH
BLACK
BROWN
RED
ORANGE
PURPLE
BLUE
VIOLET
GREEN
YELLOW
WHITE
115v BLACK
0v BROWN
115v RED
0v PURPLE
8.75v BLUE
200v BLUE
0v VIOLET
EARTH GREEN
BROWN
GREEN/YELLOW
BLUE
+5v
DIG COM
CAL
30 DAYS
1YR
24 HR
DIG COM
EXT TRIG
J4
J5
J3
J7
J8
J2
REAR P.C.B. 400295
J1
EARTH
-175v
+5v
J6
SIG (B.C.D. ONLY)
EXT TRIG
LINE FREQ
SIG
24HR
1YEAR
CAL
DIG. COM.
+5v
NULL DET
COND VAL
TO ANALOGUE P.C.B.
CENTRE P.C.B. 400296
DIGITAL P.C.B. 400526
I.E.E.E. BUS P.C.B. 400427
J1 (24 WAY)
J2 (16 WAY)
R/W
IRQ IO
XIOBD
XKDSP
DIG COM
DISPLAY DRIVER P.C.B. 400301
CD3
CD2
CD1
CD0
CD4
CD5
CD6
CD7
IRQK1
IRQK2
XKDSP0
XKDSP2
XKDSP1
CMOS CLK
XKY BRD
XKD SP3
R.H. SIDE P.C.B. 400298
SEG h
SEG b
SEG c
SEG d
SEG e
SEG g
SEG f
SEG a
-180v
ARKA
FRONT P.C.B. 400294
S29
OUT GUARD
datron ELECTRONICS LIMITED NORWICH

50-IEEE 488 BUS OPTION			
O/P OPTION PCB. SKT	REAR ADAPT. PCB. SKT	REAR PANEL SKT.	FUNCTION
J1 - 1		J27 - 1	DIO 1
2		2	DIO 2
3		3	DIO 3
4		4	DIO 4
5		5	E.O.I
6		6	D.A.V
7		7	NRFD
8		8	NDAC
9		9	IFC
10		10	SRQ
11		11	ATN
12		12	SHIELD
13		13	D.I.O.5
14		14	DIO.6
15		15	DIO7
16		16	DIO.8
17		17	REN
18		18	GND (6)
19		19	" (7)
20		20	" (8)
21		21	" (9)
22		22	" (10)
23		23	" (11)
24		24	" LOGIC
J2 - 1			T.O.
2			A5
3			A4
4			+5v
5			+5v
6			A3
7			A2
8			A1
9			A1
10			A2
11			A3
12			+5v
13			+5v
14			A4
15			A6
16			T.O.

DRAWN IL	DATE 4.2.83	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm ANGULAR + ½°	MATERIAL —	ASSY DRG & PARTS LIST 400524	TITLE 1081 INTERCONNECTION DIAGRAM	DRAWING No. 430524
CHECKED NJO	DATE 18.2.83	SCALE —		FINISH —	CIRCUIT DIAGRAM		
APPR. RWF.	DATE 12-4-83	NOT TO BE SCALED	UNLESS OTHERWISE STATED FIRST ANGLE PROJECTION		CHECK PROCEDURE 460524 CHECK LIST 470524		SHEET 1 OF 2

INTERCONNECTIONS 2


430524
IN GUARD
REAR PANEL 400205
SIG I/P J11
REF I/P J10
AN. O/P J12
RED
BLACK
AN O/P Hi
AN O/P Lo
T2 MAINS Tx 300012
YELLOW
GREY
ORANGE
WHITE
PINK
ANALOGUE OUTPUT P.C.B. 400308
REAR I/P RATIO PCB 400506
J2
J3
J4
J5
J6
TO FRONT PANEL TERMINALS
REAR P.C.B. 400295
J13
J11
J9
J10
J6
J14
J8
OP SEL CLK
AD4
0V
+15V
-15V
AD6
ISOL O/P
L.H. SIDE P.C.B. 400297
A.C. PCB. 400504
OHMS P.C.B. 400505
ANALOGUE P.C.B. 400503
CENTRE P.C.B 400296
TO DIGITAL P.C.B
AD0
AD1
AD2
AD3
AD5
AD7
L.D. CLK
HF FLAG
H.F. AUTOCAL
O/P COM
Ω REF COM.
-V REF
+5V
NULL DET.
COND. VAL.
IA1
IA0
ID0
ID1
ID2
ID3
ID4
ID5
ID6
ID7
LOW IN
LOW OUT
ΩGU
I-
I+
BS
Hi
Lo
GU
REAR I/P RATIO PCB 400506 J4 + J6
R1
R2
4-WIRE
2-WIRE
REMOTE
LOCAL
FRONT P.C.B. 400294
datron ELECTRONICS LIMITED NORWICH

DRAWN IL	DATE 4.2.83	DIMENSIONS IN MILLIMETRES	TOLERANCES DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm ANGULAR ± ½°	MATERIAL	ASSY DRG & PARTS LIST 400524 CIRCUIT DIAGRAM CHECK PROCEDURE 460524 CHECK LIST 470524	TITLE 1081 INTERCONNECTION DIAGRAM
CHECKED MD	DATE 18.2.83	SCALE	UNLESS OTHERWISE STATED	FINISH		DRAWING No. 430524
APPR. R.W.F.	DATE 12-4-83	NOT TO BE SCALED	FIRST ANGLE PROJECTION			SHEET 2 OF 2

DRAWING No. 430526

FIRST USED ON 1081

THIRD ANGLE PROJECTION

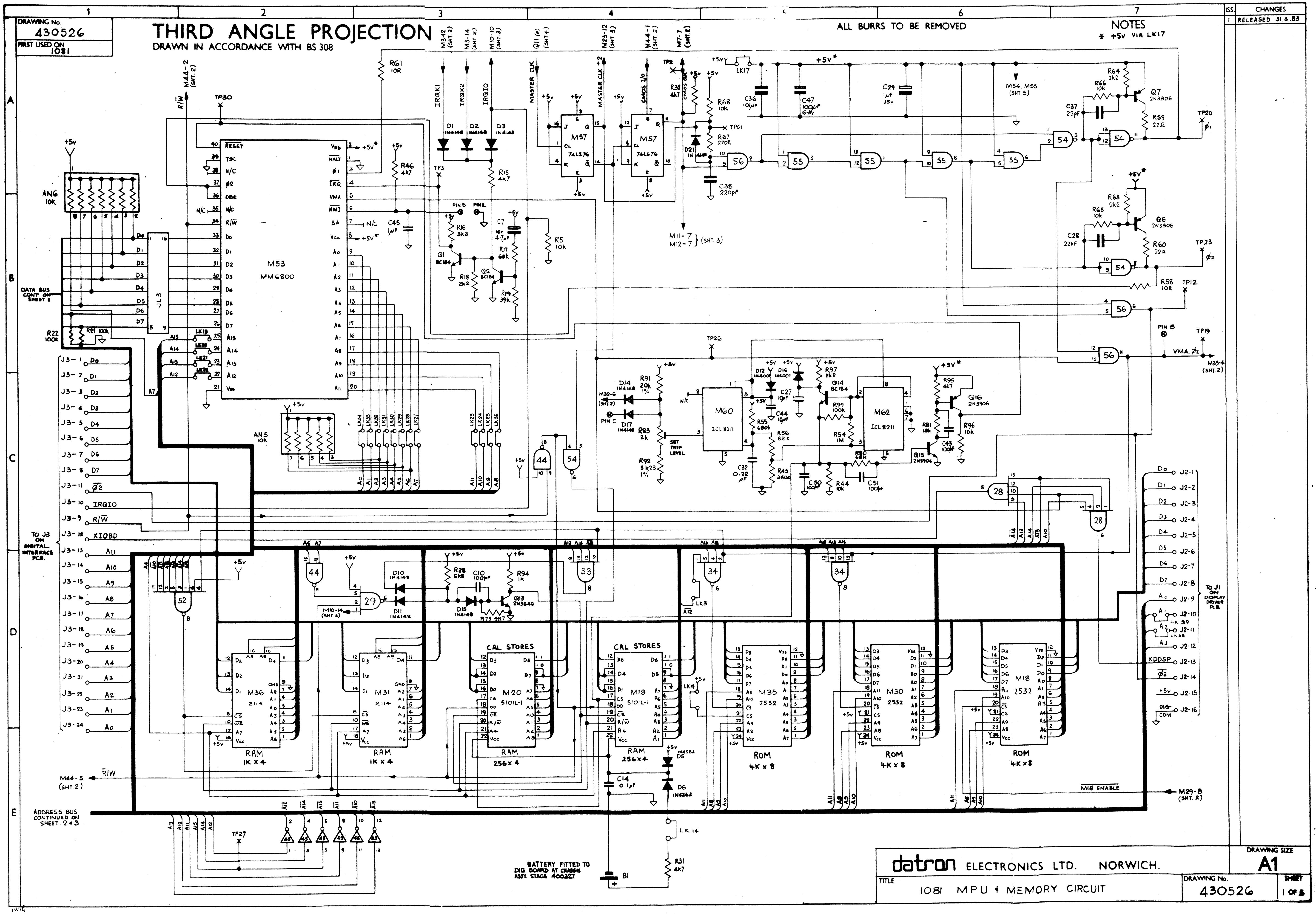
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

* +5v VIA LK17

ISS.	CHANGES
1	RELEASED 31.8.83



M53
MMG800
M57
74LS76
M60
ICL 8211
M62
ICL 8211
JL3
AN6 10k
AN5 10k
DATA BUS CONT. ON SHEET 2
TO J3 ON DIGITAL INTERFACE PCB.
TO J1 ON DISPLAY DRIVER PCB
M36 2114 RAM 1K x 4
M31 2114 RAM 1K x 4
CAL STORES M20 5101L-1 RAM 256 x 4
CAL STORES M19 5101L-1 RAM 256x4
M35 2532 ROM 4K x 8
M30 2532 ROM 4K x 8
M18 2532 ROM 4K x 8
M44-5 (SHT. 2) R/W
ADDRESS BUS CONTINUED ON SHEET. 2 & 3
BATTERY FITTED TO DIG. BOARD AT CHASSIS ASSY. STAGE 400327.
B1
M18 ENABLE
M29-8 (SHT. 2)
M33-4 (SHT. 2)
VMA.φ2
MASTER CLK
MASTER CLK ÷2
CMOS I/O
IRQK1
IRQK2
IRQIO
XIOBD
XDDSP
SET TRIP LEVEL
M11-7 M12-7 (SHT 3)
M54, M55 (SHT. 5)
M10-14 (SHT. 3)
M32-6 (SHT. 2)
PIN C
PIN B
Q7 2N3906
Q6 2N3906
Q16 2N3906
Q15 2N3904
Q14 BC184
Q13 2N3646
Q1 BC184
Q2 BC184

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE 1081 MPU + MEMORY CIRCUIT

DRAWING No. 430526

SHEET 1 OF 3

DIGITAL 1 MPU + MEMORY

DIGITAL 2 CMOS

1	2	3	4	5	6	7

DRAWING No. 430526

FIRST USED ON

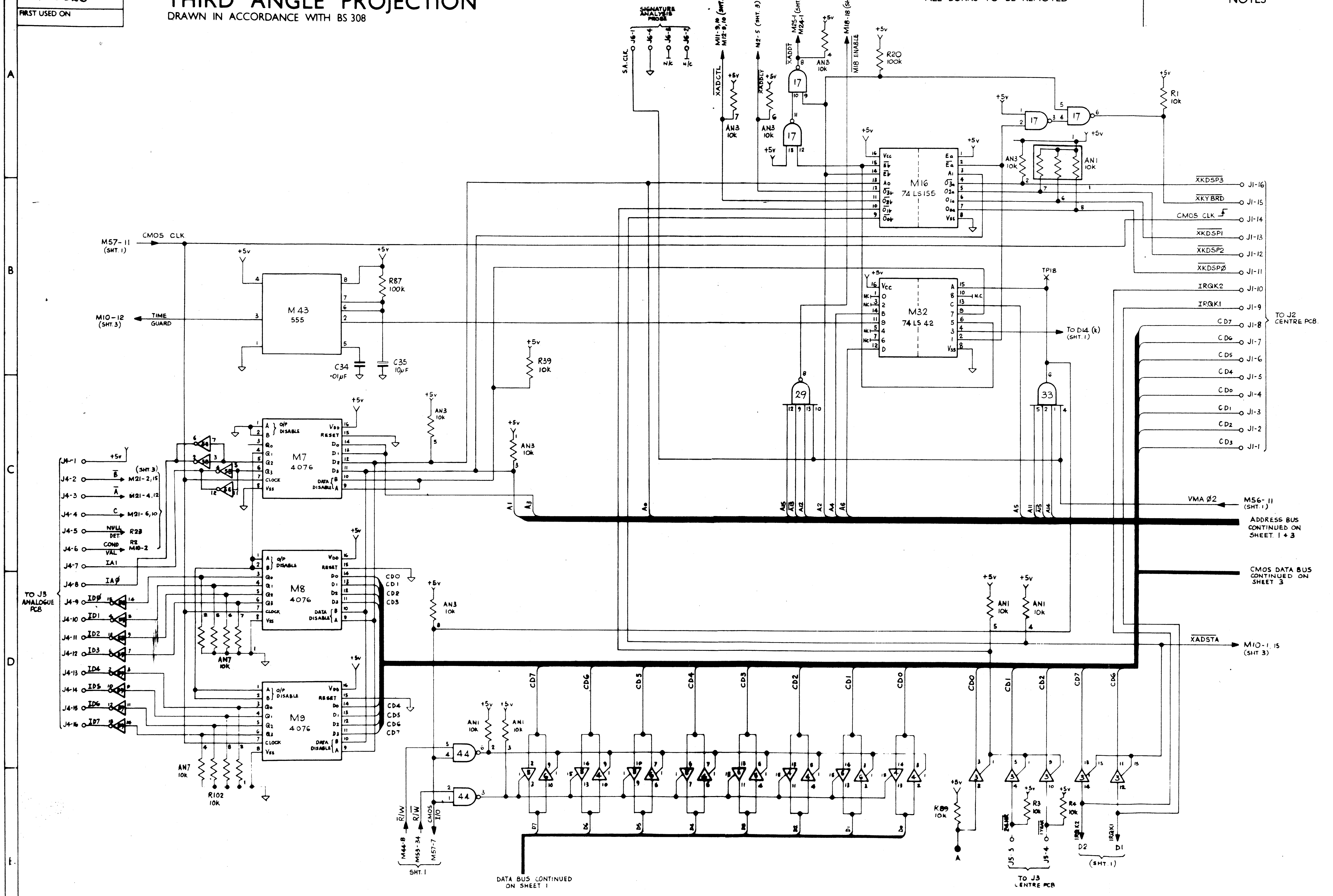
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED 31.3.83


A
B
C
D
E
SIGNATURE ANALYSIS PROBE
S.A.CLK.
J6-1
J6-4
J6-3
J6-2
N/C
N/C
M11-9,10 M12-9,10 (SHT.3)
XADCTL
M2-5 (SHT.3)
XADDLY
M25-1 M24-1 (SHT.3)
XADDT
M18-18 (SHT.1)
M18 ENABLE
+5v
AN3 10k
R20 100k
R1 10k
17
M16 74LS155
AN1 10k
XKDSP3
XKYBRD
CMOS CLK
XKDSP1
XKDSP2
XKDSPØ
IRQK2
IRQK1
CD7
CD6
CD5
CD4
CD0
CD1
CD2
CD3
J1-16
J1-15
J1-14
J1-13
J1-12
J1-11
J1-10
J1-9
J1-8
J1-7
J1-6
J1-5
J1-4
J1-3
J1-2
J1-1
TO J2 CENTRE PCB.
M57-11 (SHT.1)
CMOS CLK
M43 555
R87 100k
C34 ·01μF
C35 10μF
M10-12 (SHT.3)
TIME GUARD
R39 10k
TP18
M32 74LS42
N.C.
TO D14 (k) (SHT.1)
29
33
M7 4076
M8 4076
M9 4076
O/P DISABLE
CLOCK
DATA DISABLE
RESET
AN7 10k
R102 10k
J4-1
J4-2
J4-3
J4-4
J4-5
J4-6
J4-7
J4-8
J4-9
J4-10
J4-11
J4-12
J4-13
J4-14
J4-15
J4-16
(SHT.3)
B
M21-2,15
A
M21-4,12
C
M21-6,10
NULL DET
R23
COND VAL
R2 M10-2
IA1
IAØ
IDØ
ID1
ID2
ID3
ID4
ID5
ID6
ID7
TO J3 ANALOGUE PCB
A1
A3
A0
A15
A13
A12
A2
A4
A6
A5
A11
A13
A14
VMA Ø2
M56-11 (SHT.1)
ADDRESS BUS CONTINUED ON SHEET 1 + 3
CMOS DATA BUS CONTINUED ON SHEET 3
XADSTA
M10-1 15 (SHT 3)
44
R/W
R/W
CMOS I/O
M44-8
M53-34
M57-7
SHT.1
DATA BUS CONTINUED ON SHEET 1
D7
D6
D5
D4
D3
D2
D1
D0
K89 10k
R3 10k
R4 10k
J5-5
J5-4
TO J3 CENTRE PCB
IRQK2
IRQK1
D2
D1
(SHT.1)

DRAWN IL	CHECKED L.O.G.	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± · INCH DIMENSIONS DECIMAL TO 3 PLACES ± ·001 DECIMAL TO 2 PLACES ± ·010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± ·1mm DECIMAL TO 1 PLACE ± ·2mm WHOLE DIMENSIONS ± ·4mm UNLESS OTHERWISE STATED	MATERIAL ——	
TRACED	APPROVED R.W.F.	SCALE ——		FINISH ——	
DATE 28.1.83	DATE	NOT TO BE SCALED			

datron ELECTRONICS LTD. NORWICH

TITLE 1081 CMOS ADDRESS DECODE + I/O CCT.

DRAWING No. 430526

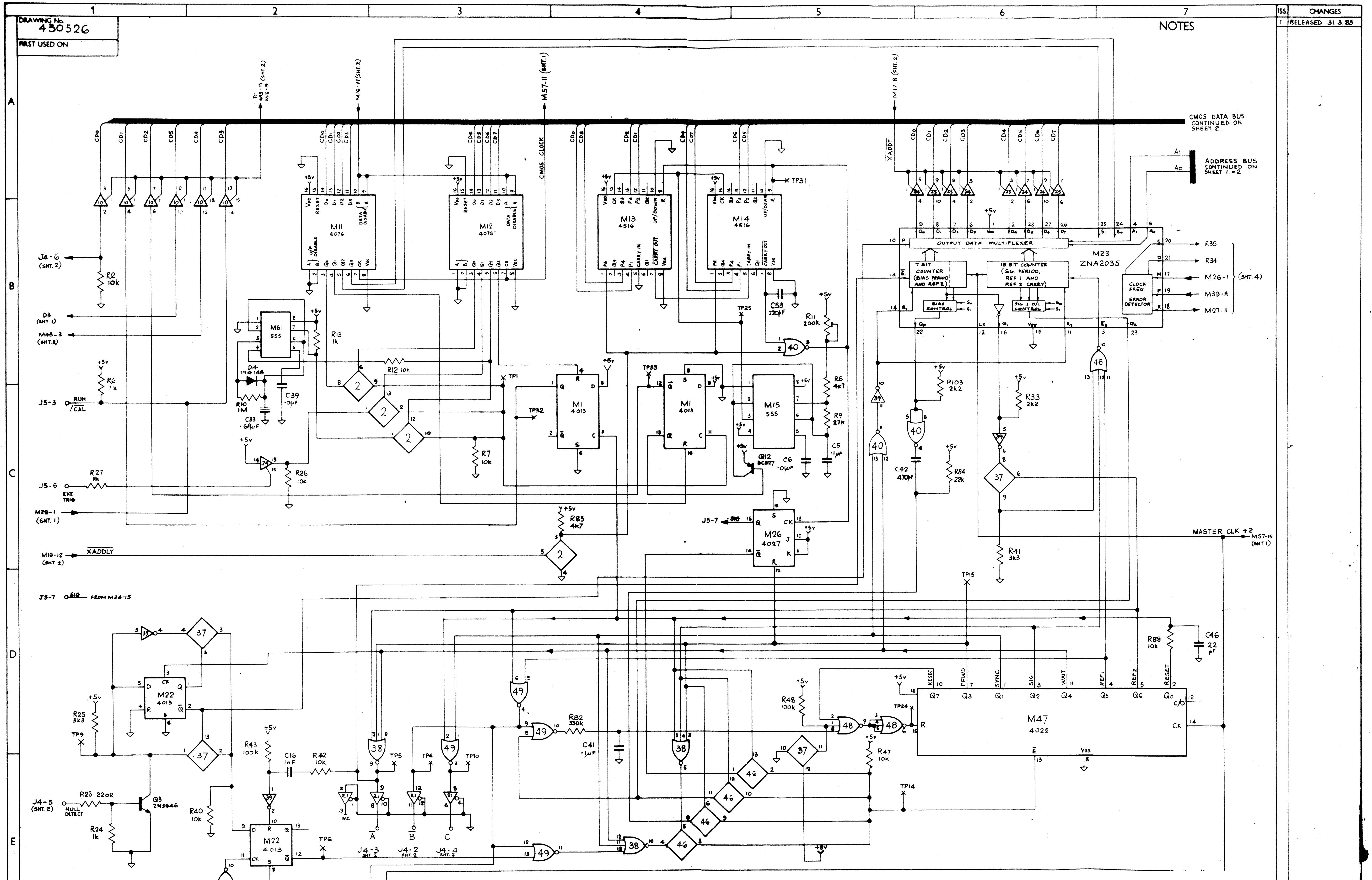
SHEET 2 OF 5

DRAWING No. 430526

FIRST USED ON

NOTES

ISS.	CHANGES
1	RELEASED 31.3.83



CMOS DATA BUS CONTINUED ON SHEET 2
ADDRESS BUS CONTINUED ON SHEET 1 & 2
M11 4076
M12 4076
M13 4516
M14 4516
M23 ZNA2035
OUTPUT DATA MULTIPLEXER
7 BIT COUNTER (BIAS PERIOD AND REF 2)
15 BIT COUNTER (SIG PERIOD, REF 1 AND REF 2 CARRY)
BIAS CONTROL
SIG & O/L CONTROL
CLOCK FREQ
ERROR DETECTOR
M61 555
M15 555
M1 4013
M26 4027
M22 4013
M47 4022
CMOS CLOCK
M5-15 (SHT.2) M16-9
M16-11 (SHT.2)
M57-11 (SHT.1)
M17-8 (SHT.2)
XADDT
J4-6 (SHT.2)
D3 (SHT.1)
M48-3 (SHT.2)
J5-3 RUN/CAL
J5-6 EXT. TRIG
M29-1 (SHT.1)
M16-12 (SHT.2) XADDLY
J5-7 SIG FROM M26-15
J5-7 SIG
J4-5 (SHT.2) NULL DETECT
Q3 2N3646
Q12 BC327
R35
R34
M26-1 (SHT.4)
M39-8
M27-11
MASTER CLK ÷2 M57-15 (SHT 1)
FFWD SYNC SIG- WAIT REF1 REF2 RESET
A B C
J4-3 SHT.2
J4-2 SHT.2
J4-4 SHT.2
TP1 TP5 TP6 TP9 TP10 TP14 TP15 TP24 TP25 TP31 TP32 TP33

DRAWN	CHECKED	DIMENSIONS IN
IL	L.O.G.	MILLIMETRES
TRACED	APPROVED	SCALE
	R.W.F.	
DATE	DATE	NOT TO BE SCALED
31.1.83	31-3-83	

TOLERANCES ANGULAR ±½°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± ½mm
WHOLE DIMENSIONS ± ½mm
UNLESS OTHERWISE STATED

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE 1081 A-D CONVERTER.

DRAWING SIZE A1

DRAWING No 430526

SHEET 3 OF

DIGITAL 3 ADC

1	2	3	4	5	6	ISS.	CHANGES
						1	RELEASED 31.3.

DRAWING No.
430526
FIRST USED ON

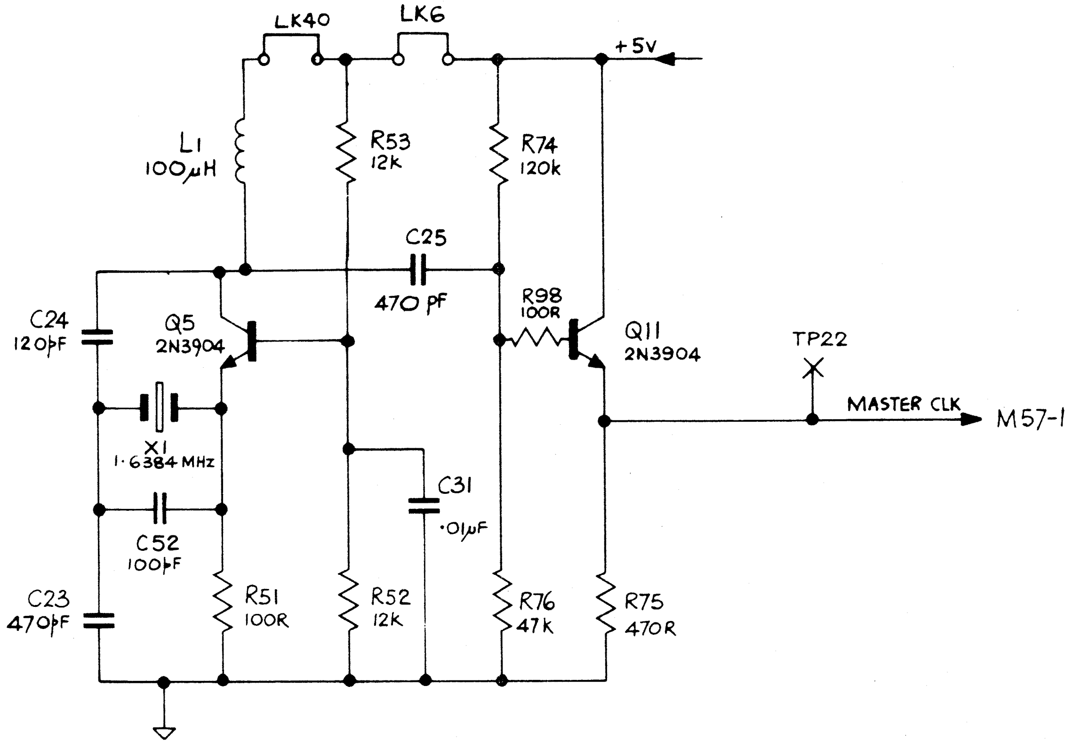
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

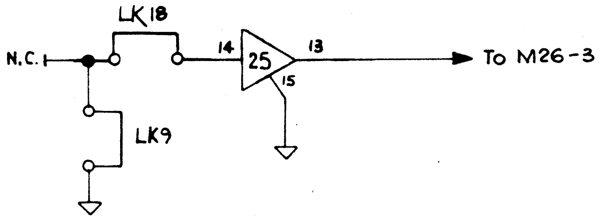
NOTES

A

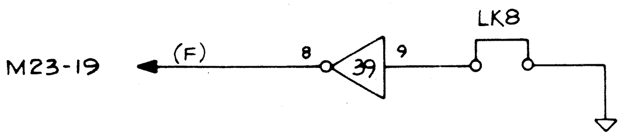

LK40
LK6
+5v
L1
100μH
R53
12k
R74
120k
C25
470 pF
R98
100R
C24
120pF
Q5
2N3904
Q11
2N3904
TP22
MASTER CLK
M57-1
X1
1·6384 MHz
C31
·01μF
C52
100pF
C23
470pF
R51
100R
R52
12k
R76
47k
R75
470R

B

C


N.C.
LK18
14
25
13
15
To M26-3
LK9

D


LK8
M23-19
(F)
8
39
9

DRAWN	CHECKED	DIMENSIONS IN
IL	L.O.G.	
TRACED	APPROVED	MILLIMETRES
	RW.F	SCALE
DATE	DATE	
28.1.83	31-3-83	NOT TO BE SCALED

TOLERANCES ANGULAR + ½°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± ·005
DECIMAL TO 2 PLACES ± ·010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ∓ 4mm
UNLESS OTHERWISE STATED

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE
A2

TITLE
1081 1·6MHz CLOCK CIRCUIT

DRAWING No.
430526

SHEET
4 OF 5

DIGITAL 4 CLOCK

1 2 3 4 5 6

DRAWING No.
430526
FIRST USED ON

THIRD ANGLE PROJECTION

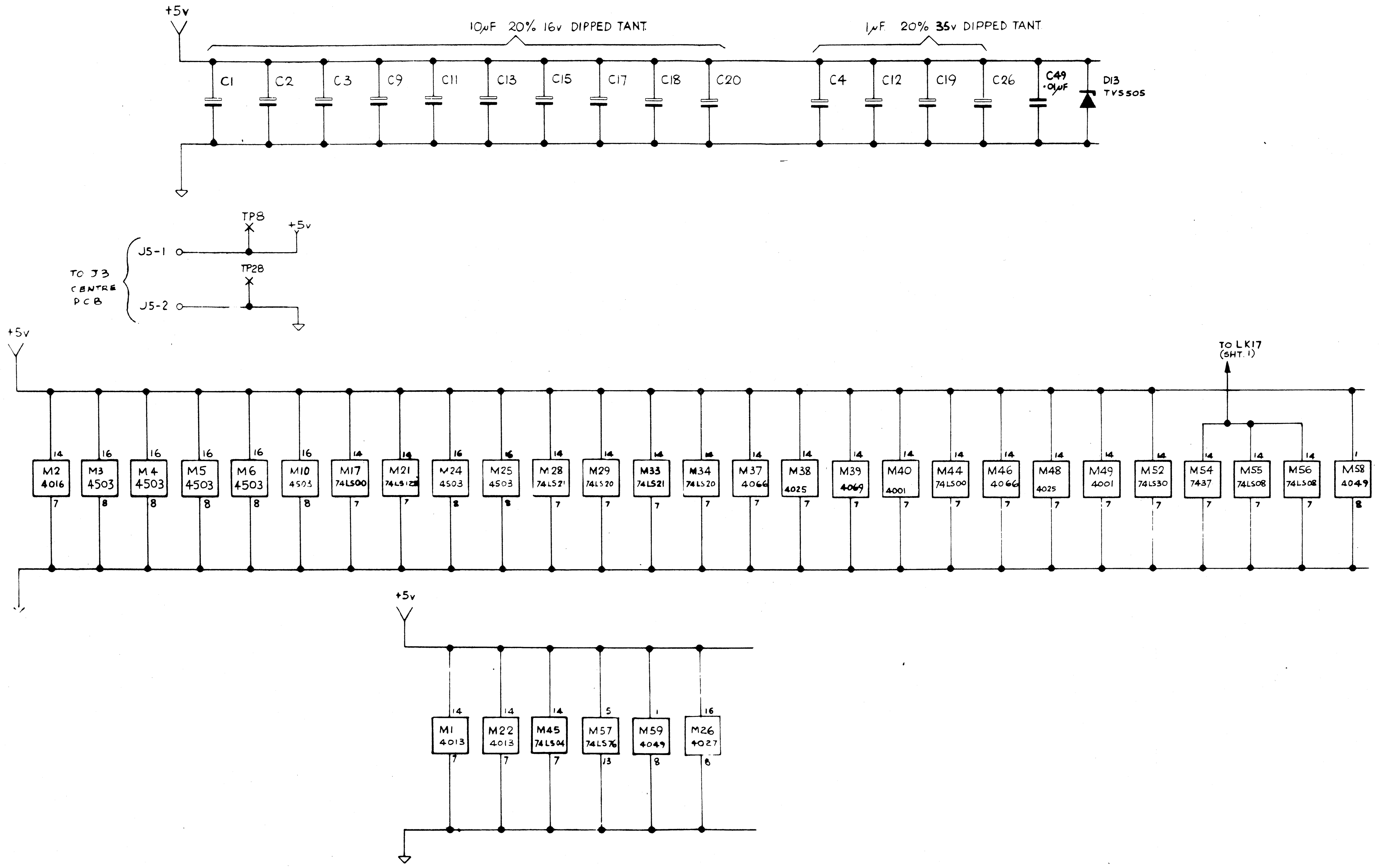
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED 31.3.83

DIGITAL 5 POWER DIST.



+5v
10µF 20% 16v DIPPED TANT.
C1
C2
C3
C9
C11
C13
C15
C17
C18
C20
1µF 20% 35v DIPPED TANT
C4
C12
C19
C26
C49 ·01µF
D13 TVS505
TP8
+5v
TO J3 CENTRE PCB
J5-1
TP28
J5-2
+5v
TO LK17 (SHT. 1)
14 M2 4016 7
16 M3 4503 8
16 M4 4503 8
16 M5 4503 8
16 M6 4503 8
16 M10 4503 8
14 M17 74LS00 7
14 M21 74LS123 7
16 M24 4503 8
16 M25 4503 8
14 M28 74LS21 7
14 M29 74LS20 7
14 M33 74LS21 7
14 M34 74LS20 7
14 M37 4066 7
14 M38 4025 7
14 M39 4069 7
14 M40 4001 7
14 M44 74LS00 7
14 M46 4066 7
14 M48 4025 7
14 M49 4001 7
14 M52 74LS30 7
14 M54 7437 7
14 M55 74LS08 7
14 M56 74LS08 7
1 M58 4049 8
+5v
14 M1 4013 7
14 M22 4013 7
14 M45 74LS04 7
5 M57 74LS76 13
1 M59 4049 8
16 M26 4027 8

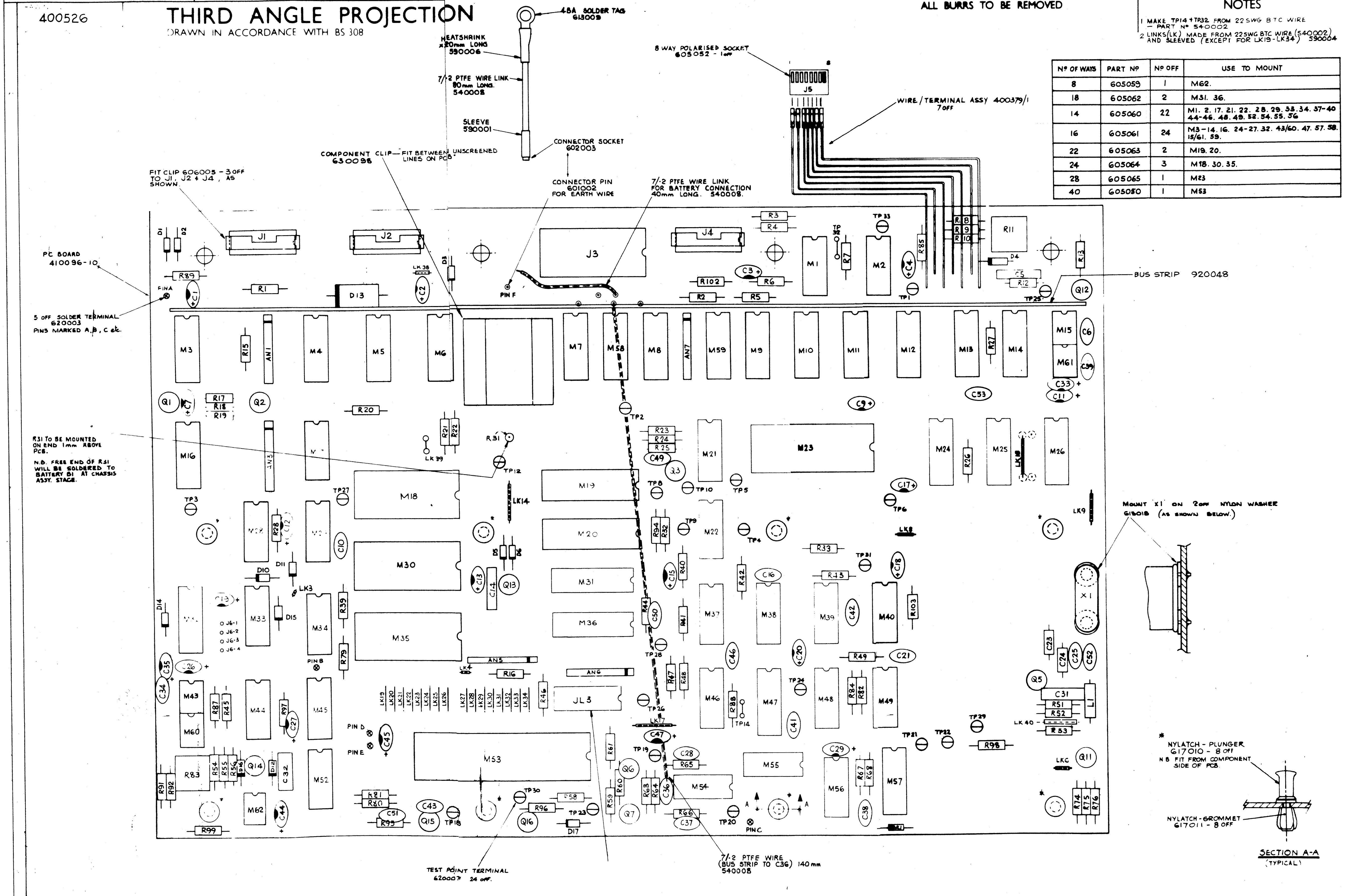
DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
IL	L.O.G.	MILLIMETRES				
TRACED	APPROVED R.W.F.	SCALE		FINISH	TITLE 1081 DIGITAL P.C.B. ASSY.	DRAWING No. 430526
DATE 28.1.83	DATE 31-3-83	NOT TO BE SCALED				SHEET 5 OF 5

400526

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED


4BA SOLDER TAG 613005
HEATSHRINK x 20mm LONG 590006
7/·2 PTFE WIRE LINK 80mm LONG. 540008
SLEEVE 590001
CONNECTOR SOCKET 602003
8 WAY POLARISED SOCKET 605052 - 1off
J5
WIRE / TERMINAL ASSY 400379/1 7 OFF
COMPONENT CLIP 630098 — FIT BETWEEN UNSCREENED LINES ON PCB
FIT CLIP 606005 - 3 OFF TO J1, J2 + J4, AS SHOWN.
CONNECTOR PIN 601002 FOR EARTH WIRE
7/·2 PTFE WIRE LINK FOR BATTERY CONNECTION 40mm LONG. 540008.
PC BOARD 410096-10
5 OFF SOLDER TERMINAL 620003 PINS MARKED A, B, C etc.
BUS STRIP 920048
R31 TO BE MOUNTED ON END 1mm ABOVE PCB.
N.B. FREE END OF R31 WILL BE SOLDERED TO BATTERY B1 AT CHASSIS ASSY. STAGE.
MOUNT X1 ON 2 OFF NYLON WASHER 615018 (AS SHOWN BELOW.)
X1
NYLATCH - PLUNGER 617010 - 8 OFF
N.B. FIT FROM COMPONENT SIDE OF PCB
NYLATCH - GROMMET 617011 - 8 OFF
SECTION A-A (TYPICAL)
TEST POINT TERMINAL 620007 24 off.
7/·2 PTFE WIRE (BUS STRIP TO C36) 140mm 540008
J1
J2
J3
J4
M1
M2
M3
M4
M5
M6
M7
M58
M8
M59
M9
M10
M11
M12
M13
M14
M15
M61
M16
M18
M19
M20
M21
M22
M23
M24
M25
M26
M30
M31
M33
M34
M35
M36
M37
M38
M39
M40
M43
M44
M45
M46
M47
M48
M49
M52
M53
M54
M55
M56
M57
M60
M62
JL3
D13
AN1
AN3
AN5
AN6
AN7
Q1
Q2
Q5
Q6
Q7
Q11
Q12
Q13
Q14
Q15
Q16
R11
TP1
TP2
TP25
TP32
TP33
PIN F
PIN B
PIN C
PIN D
PIN E
FINA
LK38
LK39
LK14
LK3
LK4
LK8
LK9
LK17
LK18
LK40
LKG

NOTES

1 MAKE TP14 + TP32 FROM 22SWG BTC WIRE — PART Nº 540002

2 LINKS (LK) MADE FROM 22SWG BTC WIRE (540002) AND SLEEVED (EXCEPT FOR LK19-LK34) 590004

Nº OF WAYS	PART Nº	Nº OFF	USE TO MOUNT
8	605059	1	M62.
18	605062	2	M31. 36.
14	605060	22	M1. 2. 17. 21. 22. 28. 29. 33. 34. 37-40 44-46. 48. 49. 52. 54. 55. 56
16	605061	24	M3-14. 16. 24-27. 32. 43/60. 47. 57. 58. 15/61. 59.
22	605063	2	M19. 20.
24	605064	3	M18. 30. 35.
28	605065	1	M23
40	605050	1	M53

ISS.	CHANGES
A	
1	RELEASED 31.3.83
2	ECOs. 1479. 1487. 1488. 18.5.83 J.R. B.J.
3	ECO. 1461. EARTH WIRE ADDED. LINK (DIG. COM. LOW IMPEDANCE) BETWEEN BUS STRIP + C36 ADDED IL 31.5.83
4	ECO. 1503 M18 M30 + M35 WERE ISSUE 198 IL 20.6.83

DIGITAL PCB

IL	CHECKED L.O.G.	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACE ± .005 DECIMAL TO 2 PLACE ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL	DRAWING SIZE A1
TRACED	APPROVED R.W.F.	SCALE 2:1		FINISH	
DATE 13.12.82	DATE 31-3-83	NOT TO BE SCALED			

datron ELECTRONICS LTD. NORWICH.

TITLE 1081 DIGITAL PCB. ASSY

DRAWING No. 400526

SHEET 1 OF 15